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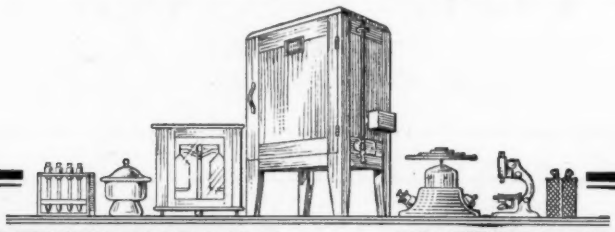

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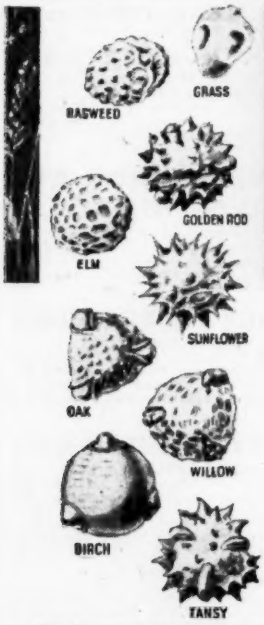

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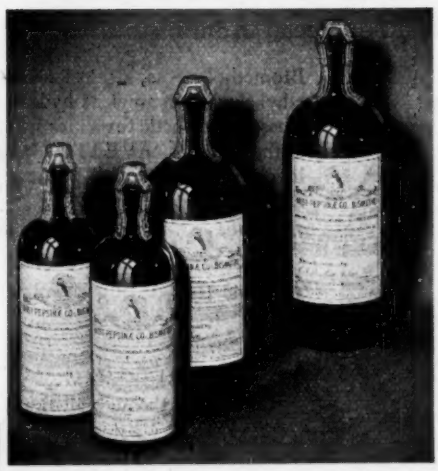

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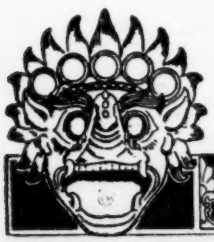

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M B EDIN
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IN spite of the wide use of sulphonamides locally, either prophylactically or in the treatment of established infection, the value of the treatment is still not accurately known and widely different opinions are regularly expressed (see *Lancet* 1942). Many seem to think, largely on the basis of results with virulent animal infections, that it is of great value in prophylaxis but has no place as a curative measure. The difficulties of assessing its value are considerable and a final assessment may only be obtained from a statistical analysis of a very large number of comparable wounds. Nevertheless, to discount this treatment altogether, as some do, suggests that a lack of knowledge of the mode of action of the sulphonamides is still very general among clinical observers.

It is essential to recognise that these drugs have a direct antibacterial action and that their curative action is due entirely to this, and not to any indirect action on the body tissues generally. The most important proof of this was the finding by Woods (1940) that *p*-aminobenzoic acid antagonised the action of sulphanilamide. Fildes (1940) postulated that the sulphonamides act by blocking the enzyme concerned in the further utilisation of *p*-aminobenzoic acid in the bacterial cell. This theory has received much experimental support from several workers, including Green and Bielschowsky (1942). The latter workers showed that the sulphonamide itself, and not some derivative of it, is most probably the active substance, and that the ether-soluble anti-sulphanilamide substance in bacteria is almost certainly *p*-aminobenzoic acid. The demonstration of its mode of action is the most conclusive evidence of its purely direct effect, but the following facts (there is no space to discuss the now extensive literature) give additional support to it. (1) Sulphonamides are effective in synthetic media (i.e., in the absence of tissue extracts). (2) Their in-vitro activity in most instances parallels that in vivo. (3) Numerous investigations have shown that they have no effect on the cellular or humoral defence processes of the body. (4) Local treatment of experimental wounds is effective against many types of infection, both prophylactically and curatively. From the experimental standpoint, therefore, there is every reason for expecting the sulphonamides to be efficient local bacteriostatic agents in human infections.

TABLE I—DIMINISHING INHIBITORY EFFECT OF *p*-AMINOBENZOIC ACID ON SULPHANILAMIDE, SULPHAPYRIDINE AND SULPHATHIAZOLE DEMONSTRATED IN INOCULUM OF *Brucella paramelitensis*, 2×10^4 COCCI PER ML.

*p*AA (mg. per 100 c.cm.)	Percentage of incident light absorbed at 48 hr.		
	Sulphanilamide 1/1000	Sulphapyridine 1/1000	Sulphathiazole 1/1000
0	0 (4)	0 (4)	0 (∝)
20	52	36	0 (4)
2	48	40	0 (5)
0·2	52	40	0 (12)
0·02	59	35	0 (∝)
0·002	48	17	0 (∝)
Broth controls	51	46	48

Figures in parentheses indicate number of days at which turbidity first appeared. *p*AA = *p*-aminobenzoic acid.

Another widely held and fallacious view is that the different sulphonamides are specific for certain bacterial species. The fact is that the bacteriostatic effect on any species is directly related to the capacity of the compound to block the enzyme whose substrate is *p*-aminobenzoic acid. Sulphanilamide, sulphapyridine and sulphathiazole require increasing amounts of *p*-aminobenzoic acid to antagonise them (see table I) and the increase is proportionately the same whatever the test organism. Quantitative studies on a number of organisms show that the amounts required are in the order of roughly 1 : 5 : 50 and the ratios of the bacteriostatic potencies of the three compounds is of roughly the same order with comparatively small variations for different organisms. These variations are due to the action of the heterocyclic half of the molecule of sulphapyridine and sulphathiazole (e.g., the thiazole group on staphylococci) which gives them a more selective action on certain bacteria. It must be stressed that from the clinical aspect these differences in species susceptibility are relatively unimportant. At similar concentrations the ratio of the bacteriostatic powers of sulphathiazole and sulphanilamide is roughly 50 with *Staphylococcus aureus* and yet the ratio is only reduced to 25 with *Bacterium coli*, an organism which is much more sensitive to sulphonamides in general. In other words, sulphathiazole is the sulphonamide of choice in staphylococcal (and any other type not highly sensitive to sulphanilamide) infections mainly because it is the most effective sulphonamide generally available in this country.

The therapeutic effect of these compounds when given by mouth is modified by their rate of absorption, but in local use the modifying factor is their solubility in the tissue fluids. The much greater solubility of sulphanilamide (cir. 1/70) as compared with sulphathiazole (cir. 1/700) possibly wholly offsets its weaker bacteriostatic action since the ratio, $\frac{\text{sulphonamide concentration}}{\text{no. of bacteria killed}}$, falls rapidly with increasing concentration of the drug (Green 1940). The period for which the bacteria are exposed to a saturated solution is, however, a more important factor than the solubility of the compounds, if their in-vitro potencies at saturation levels are not widely different. Bacteria, if still viable, rapidly recover from sulphonamide inhibition, so that the optimal effect is obtained by maintaining a high concentration continuously until most of the bacteria are killed directly by the drug or by phagocytosis. Under these conditions, provided complete access can be obtained, local treatment ought to be more effective than general, for, given orally or parenterally, the concentration of sulphathiazole in the infected area will not be more and may be very much less than a tenth of that reached after local application. A high local concentration is also often essential, since many bacteria (e.g., *Staph. aureus*, *Bact. coli*) which are relatively insensitive at the concentration reached in the blood (say 1/10,000) are quite sensitive to a much higher concentration (say 1/1000). It is important, in fact, to recognise that all bacteria are sensitive in some degree to the bacteriostatic action of the sulphonamides, though in some instances (e.g., *Pseudomonas pyocyanea*, *Bacillus subtilis*) the concentration must approach saturation point before the effect is really significant.

Another very real advantage of local treatment is that the danger of toxic effects is slight. Even with continuous application to large, infected wounds the blood concentration in our series did not rise much above 2 mg. per 100 c.cm. and it was usually below 1 mg. The hazards of systemic sulphonamide treatment, in particular the renal complications, are thus obviated.

OBJECTIONS TO LOCAL APPLICATION

The optimal conditions for sulphonamide therapy—i.e., a continuous high concentration without systemic damage—ought to be attained by local application. What are the objections? They may be briefly classified as follows.

(1) Pus and tissue exudates have an anti-sulphonamide action. This is due to anti-sulphonamide factors (probably chiefly *p*-aminobenzoic acid) released from bacteria and also from digested tissues; the amount supplied by each is not known and will vary with the type of bacteria and the degree of tissue destruction. This is probably the main factor tending to prevent the antibacterial effect of the sulphonamides, but the same antagonism must play a part when the drug reaches the area via the blood-stream, though possibly not to the same extent. On the other hand, the higher concentration of the compound attained in local treatment demands a proportionately greater amount of anti-sulphonamide factor to neutralise its effect, and, if the infected area is kept as free from exudate as possible by

thorough removal before each treatment, the clinical results suggest that this anti-sulphonamide action is not usually sufficient to completely neutralise the effect of the sulphonamide. Provided that even slight bacteriostasis is achieved, the diminishing number of bacteria will cause a reduction in the supply of anti-sulphonamide factor from both bacteria and tissues, and, so long as continuous saturation is maintained, progressive improvement must occur once the balance has changed in favour of sulphonamide. If pus formation is excessive and an early response to treatment does not occur, repeated cleansing, with fresh applications of the powder, is necessary until the local infection shows signs of subsiding. In our series of cases obvious improvement usually set in in the first few days. Failure is probably often due to a lack of persistence in treatment in the initial stages when an excessive amount of anti-sulphonamide factor is preventing rapid bacterial destruction.

(2) The sulphonamides are absorbed from the local site, and in the case of the most soluble compound, sulphanilamide, this absorption is rapid. Viable organisms will then rapidly multiply again and it is theoretically possible that the renewed growth may be greater than the normal, for there is some evidence that very low concentrations of the sulphonamides may have a growth-stimulating action on bacteria (Green 1940, Green and Bielschowsky 1942). This objection applies particularly to the prophylactic treatment of sutured or very deep wounds, and failure in these cases could be due to lack of complete sterilisation, before, or a fresh infection from the blood-stream after, the drug has been absorbed. Theoretically prophylactic treatment should aim at using the largest possible quantities of the drug, with a preference for the more insoluble compound, but recent work (see *Lancet* 1942) suggests certain dangers in this method. In already infected wounds treatment should never allow of a period in which a surface film of powder is not present.

(3) Local damage to the tissues by a saturated sulphonamide solution is a theoretical danger. Actually, it would appear to be insignificant compared with the effect of other antiseptics. Glynn (1941) has shown in rabbit granulation tissue that a barely significant inhibition of fibroblast proliferation is produced by sulphathiazole and sulphapyridine, but not by sulphanilamide. Sulphathiazole has no toxic action on striped muscle, whereas sulphanilamide and sulphapyridine have a slight but definite one. Tissue-culture work and our own experience with animals and man indicate that they are comparatively harmless compounds to the tissues.

(4) The development of resistant strains of bacteria is probably a real danger, but here again the danger should be less with local than with systemic treatment. Strongly resistant strains only arise if viable bacteria are exposed to sulphonamides for a few weeks, but the resistance increases progressively from the time of initial exposure (Green 1940). The chance of this complication arising is much diminished if a continuous saturation with the drug is maintained from the start, thereby rapidly reducing the number of the pathogenic organisms present. Intermittent or spasmodic treatment will favour the development of these resistant organisms. An important point is that resistance to sulphathiazole is less easily developed than to either sulphanilamide or sulphapyridine. One of us (H. N. G.) has found that it was impossible, with the strain of *Bact. coli* used, to produce by "training" in sulphathiazole a strain significantly resistant to sulphathiazole, though it became strongly resistant to sulphanilamide. Preliminary observations with other bacteria suggest that resistance is less easily developed with sulphathiazole than with sulphapyridine or sulphanilamide. Sesler and Schmidt (1942) report a similar finding with the pneumococcus. This property of sulphathiazole may well be one of the main factors in its greater therapeutic effect.

(5) Hawking (1941a) has shown that a sulphonamide applied locally penetrates only a few millimetres into the infected tissue and therefore may not reach viable bacteria, which nevertheless are accessible via the blood-stream. It seems probable, however, that provided the bacteria in the necrotic tissue and exudate, which is the actual culture medium, are destroyed, the deeper granulating zone with its known capacity for combating infection is easily capable of overcoming the deeper residual infection. The rapid development of healthy granulation tissue actually observed during this treatment suggests that the reduction in toxin production in the surface exudate allows this tissue to rapidly assume its normal protective function.

The balance of experimental evidence is strongly in favour of using local treatment in localised infections. Only in this way in the presence of infection can a concentration be attained which is likely to be lethal to the hæmolytic streptococcus, pneumococcus and Neisseriæ, and strongly inhibitory to *Bact. coli*, *Staph. aureus* and even to *B. proteus* and *Ps. pyocyanea*. Of the sulphonamides at our disposal, sulphathiazole, for the reasons given, was used in the clinical trials, of which a condensed account now follows.

CLINICAL TRIALS

Methods.—The wound was gently swabbed free of pus and loose debris using gauze soaked in normal saline; it was then gently dried with dry gauze. Sulphathiazole powder, which was not sterilised (an error now rectified) was sprinkled from a sterile container, covered with one layer of gauze, over the surface to form a layer roughly ¼ in. thick. Any pockets or undermined edges were carefully filled from a small sterile spatula. When deep pockets or undermined areas existed an insufflator was used. It was then covered with several layers of dry gauze and finally with a square of gamgee tissue. In plaster cases with a "window" a firm bandage was applied to counteract "window œdema." The treatment was repeated every 2, 3 or 4 days, the aim being to maintain a continuous layer of powder in contact with the wound. It should be specially noted that the treatment was not stopped when signs of infection had disappeared but was continued, where possible, until wound healing was completed. Each treatment was carried out by one of us personally, a point of possible significance in the results obtained. Swabs from infected areas were cultured on solid and liquid media, with and without *p*-aminobenzoic acid (0·2 mg. per 100 c.cm.).

For reasons of space detailed records of only 4 of the 15 cases are given.* They illustrate the effect of the treatment on three types of bacterial infection, but otherwise were chosen arbitrarily. The main features of all the cases are summarised in table II.

CASE 1.—A man aged 38 was struck on the left leg by a steel bar. Examination revealed an irregular flesh wound extending from the external condyle of the femur to the junction of the upper and middle third of the leg. There was a compound fracture of the tibia and fibula. The wound was excised and sutured after inserting 'Vaseline' packs and a rubber drain, and the fracture was reduced and immobilised in plaster. The next day the temperature rose and sulphapyridine, 6 g. daily, was given by mouth for the next 14 days. On the 16th day after injury the packs were removed from the wound, which was found to be grossly infected and discharging pus copiously. He was still feverish and sulphapyridine in the same dosage was given for a further week. A month after the injury the wound was still grossly infected and the knee-joint was swollen. From this time the wound improved very slowly and 10 weeks after the injury the temperature settled. He was discharged after 12 weeks in hospital with the leg in plaster, with a window for continuation of the acriflavine dressings which had now been applied for some weeks.

He was referred to us for treatment 22 weeks after the injury. There was a longitudinal wound, 6 in. × 2 in. and ½ in. deep, over the upper end of the tibia. The wound was grossly infected with a free purulent discharge and with no sign of attempted healing; there were several sinuses leading down to the ununited fracture. There was slight fever (99°–100° F.). Cultures of the pus showed *Staph. aureus* and *B. proteus*. Local treatment with sulphathiazole was begun. The wound was thoroughly cleaned and final traces of exudate removed with saline swabs followed by the application of 4 g. of the powder, distributed uniformly over the surface. When the wound was examined 4 days later obvious healing was in progress; the amount of pus was much reduced and healthy granulations were evident at many points. The wound was again treated with the powder (5 g.). Nine days after beginning the treatment the wound was quite clean with abundant granulations covering it and commencing epithelial growth at the edges; the bacterial flora remained unchanged.

* The detailed records of all the remaining cases and some photographs may be seen at the Medical Research Council Offices, School of Hygiene and Tropical Medicine, London. A limited number of copies of the case-records are available from the same source for research workers.

TABLE II—INFECTED WOUNDS TREATED LOCALLY WITH SULPHATHIAZOLE

Case no.	Age (yr.)	Injury	Surface wound	Time infected before treatment (days)	Initial treatment	Causal bacteria	Elimination of causal bacteria (days)	Total sulphathiazole (g).	Surface infection (days)		Remarks
									Subsiding	Absent	
1	38	Comp. fract. tib. and fib.	6 in. × 2 in. Sinuses present	152	Acriflavine; sulphapyridine (126 g. orally)	*Staph. aureus*	N	21	5	15	Wound healed 28th day of treatment except for few small sinuses. See case-history.
2	57	Laparotomy wound	5 in. × 4 in.	18	Sulphanil- (16 g. orally)	*Strep. hæmolyticus*	11	15	3	15	Uninterrupted healing of wound.
3	51	Comp. fract. tib. and fib.	3 in. diameter	21	Winnett Orr	*Staph. aureus.*	N	18	2	13	Surface wound healed, after removing loose sequestrum, by 37th day of treatment.
4	18	Comp. fract. femur; simple fract. tib. and fib.	Supracondylar thigh amputation	5* 19†	Sulphanilamide (28 g. orally.)	*Strep. hæmolyticus; Staph. aureus*	N	45	4	15	At initial operation and at thigh amputation wounds packed with sulphanilamide. See case-history.
5	33	Fract. tib. and lacerated calf	Guillotine amputation at mid-thigh	4	Sulphapyridine (40 g. orally); AGGS	*Cl. welchii; Staph. aureus*	23	22	13	23	Oral sulphapyridine for 6 days after local treatment began. Wound packed with sulphanilamide at time of amputation. Healed 40th day of local treatment.
6	30	Comp. fract. tib. and fib.	Guillotine amputation at mid-thigh	17	Winnett Orr; sulphapyridine (72 g. orally)	*Staph. aureus; Cl. sporogenes*	7	15	3	7	Initial excised wound and amputation wound packed with sulphanilamide at time of operation.
7	62	Arthrodesis of knee-joint	Guillotine amputation at mid-thigh	65	Sulphapyridine (159 g. orally); acriflavine	*Staph. aureus.*	N	30	7	14	Uninterrupted recovery. Wound healed by 28th day.
8	18	Comp. fract. femur	Guillotine amputation at mid-thigh	60	Sodium sulphapyridine; sulphapyridine orally; eusol; acriflavine	*Strep. hæmolyticus*	N	30	3	18	Wound healed by 50th day.
9	47	Shrapnel wound of wrist	Dorsum of wrist, 2 in. diameter	8	Acriflavine; sulphapyridine (28 g. orally)	*Staph. aureus*	N	3	1	5	..
10	34	Fract. phalanx; lacerated wound	Whole of finger	28	Winnett Orr; acriflavine	Probably *Staph. aureus*	N	6	2	7	Amputation of stiff finger.
11	40	Comp. fract. tib. and fib.	2 in. × 3 in.	105	Winnett Orr; cod-liver oil dressings	*Staph. aureus*	N	13	2	12	Initial injury 4½ yr. ago with recurrent infection. Uninterrupted healing of wound with 16 days treatment.
12	23	Third-degree burn of foot	Nearly half dorsum of foot	19	Gentian violet; cod-liver oil dressings	*Ps. pyocyanea*	23	20	1	19	See case-history.
13	55	Traumatic amputation of lower legs	Amputation below L. knee	20	Sulphapyridine (36 g. orally)	*Staph. aureus*	N	60 (sulphanilamide)	8	18	Both amputation wounds packed with sulphanilamide at time of operation. Amputation stump on R. leg was much less severely infected; treated with acriflavine. Skin graft on L. at 20 days, healed a month later.
14	13	Excision of chondroma of scapula	5 in. × 2 in.	12	Open drainage	*Staph. albus* (pathogenic)	N	9	2	14	See case-history.
15	44	Open reduction of fract. spine	8 in. × 1 in.	10	Sulphapyridine (34 g. orally)	*Staph. albus* (pathogenic)	N	8	2	8	Sulphathiazole given orally 2nd to 5th day of local treatment. Wound completely healed by 10th day.

N = Not sterile while open wound still present.
AGGS = Anti-gas-gangrene serum.

* After final amputation.
† After first operation wound.

A further 4 g. of the powder was applied and 4 days later a few small sequestra near the surface were removed. By the 15th day of treatment the whole surface of the wound was covered with epithelium except for the openings of a few small sinuses which were not discharging. More powder (4 g.) was applied and the treatment repeated on the 19th day. By the 28th day the wound was soundly healed except for the small sinus openings; the fractures were united. From now on the sinuses occasionally discharged a little pus from which *Staph. aureus* was grown. He was discharged after 7 weeks in hospital with the leg in a fresh plaster. When seen 3 weeks later the wound still remained soundly healed but the skin was reddened from the irritation of small amounts of pus coming from the sinuses.

He was admitted at intervals for the removal of small superficial pieces of necrotic bone. At the present time (a year later) there is still a little discharge from one sinus, but the wound remains healed.

CASE 4.—A youth aged 18 was riding a motor cycle when he collided with a tramcar and sustained a compound fracture of the right femur, in the lower third and a simple fracture in the middle of the right tibia and fibula. A portion of the femur protruded through a 4 in. longitudinal wound commencing 3 in. above the knee on the medial aspect. The wound was excised and sutured after packing with sulphanilamide powder, the fractures reduced, and the whole limb immobilised in plaster. The temperature rose immediately after the operation to 100° F., and sulphanilamide, 4 g. daily, was given by mouth for a week, but the temperature continued fluctuating between 99° F. and 102° F. His general condition was poor. The day after the operation the thigh showed considerable œdema; the foot was cold and pale and without arterial

pulsation. The plaster was split but the foot showed no sign of returning viability and on the 6th day the lower leg was amputated 5 in. below the knee-joint and a blood-transfusion given. Signs of infection in the stump became obvious on the 9th day after injury and the knee-joint was distended with fluid. The temperature was now rising to 103° F. and on the 14th day there was a secondary hæmorrhage from the stump. This was treated effectively and a further transfusion of whole blood given. On the 15th day a further hæmorrhage occurred and since the stump was grossly infected a re-amputation was done 3 in. above the femoral condyles, the wound packed with sulphanilamide and the flaps left unsutured. Pyrexia (100° F.) continued and by the 20th day after the injury the stump wound and flaps were covered with pus and discharging profusely. Cultures grew *Streptococcus hæmolyticus*, *Staph. aureus* and *B. proteus*.

Local treatment with sulphathiazole was begun 5 days after the amputation and 20 days after the original injury; 10 g. was needed to cover the infected area completely. A further 11 g. was applied 4 days later, and 6 hours after the application the blood sulphathiazole (total) was 0·35 mg. per 100 c.cm. and after 24 hours 0·8 mg. per 100 c.cm. Further applications of 10, 5, 5, 2·5 and 2 g. were made on the 6th, 9th, 15th, 22nd and 28th days of treatment. Blood-sulphathiazole values on the 7th, 10th and 16th days were 0·25, 2·2 and 1·6 mg. per 100 c.cm. By the 6th day of treatment the temperature was normal and the wound was granulating freely and much cleaner, showing only specks of pus in small pockets, cultures from which grew *Staph. aureus* and *B. proteus*. Rapid improvement was maintained and by the 15th day the wound was quite clean and covered with thick granulation tissue. In spite of the absence of clinical infection, *Strep. hæmolyticus* and *Staph. aureus* were grown from a swab of the wound surface. The *Strep. hæmolyticus* now showed an increased in-vitro resistance to sulphanilamide but not to sulphathiazole. By the 19th day of treatment the wound edges were rapidly drawing in, and, though there was no obvious suppuration, culture grew *Ps. pyocyanea* and a few colonies of *Staph. aureus*. On the 29th day a few colonies of *Strep. hæmolyticus* only were grown from the wound swab. The wound area continued to diminish and on the 38th day an operation was performed to reconstitute a weight-bearing stump. The surgical wound remained healthy but still grew a few *Strep. hæmolyticus*, and on the 8th day after this final operation it broke down slightly and discharged a little pus from which *Strep. hæmolyticus* in pure culture was grown. The wound healed again in a few days after two applications of sulphathiazole and when last seen the patient was waiting to have an artificial limb fitted.

CASE 12.—A man aged 23 sustained a third-degree burn of his left foot when a hot bar fell across his boots. Blue dye (probably gentian violet) was applied to the burn at work and he then attended the hospital casualty department where it was dressed daily with cod-liver oil for 23 days.

Owing to complete lack of healing and increasing signs of local infection he was admitted to hospital on the 24th day after injury. There were gangrenous patches on the dorsum of the 2nd and 3rd toes and half the great toe, and a sloughing, severely infected ulcer over a third of the dorsum of the foot with the extensor tendons visible in the purulent exudate at its base. Cultures grew a profuse growth of *Ps. pyocyanea* and also colonies of *Staph. aureus*. The area was cleaned and 5 g. of sulphathiazole applied. After 2 days treatment the wound was much cleaner, now only speckled with pus, and a portion of the gangrenous tissue on the great toe was separating. Cultures grew *Ps. pyocyanea* and a few colonies of non-hæmolytic streptococci. Sulphathiazole (5 g.) was again applied. By the 6th day granulation tissue could be seen at the wound edges and the necrotic tissue had separated further. The wound, though healing, still showed suppurating foci from which *Ps. pyocyanea* and *Staph. aureus* were grown. The infected area was again covered with sulphathiazole. By the 10th day the improvement was striking; the whole wound, with the exception of the toes where gangrenous tissue was still separating, was covered by very vascular granulation tissue. It was treated with sulphathiazole and again on the 15th day and 19th day. On the latter date there was no sign of sepsis, and swabs on this and the following day were sterile. On the 23rd day slight epithelial growth could be seen at the wound edges and the gangrenous tissue had completely separated. The wound remained clean but epithelial growth was very slow, so that on the 40th day a skin graft was performed with good result. A month later the foot was quite healed and later the useless 2nd, 3rd and 4th toes were amputated.

CASE 14.—A girl aged 13 was admitted to hospital for excision of a chondroma of the inferior angle of the right scapula. The tumour, about 1 in. in diameter, along with the inferior angle of the scapula, was removed. The next day the temperature rose and fluctuated between 98° F. and 100·5° F. for the following 3 days. On the 4th day after operation the wound was tense and bulging, with beads of pus exuding from it. The tense sutures were removed and the gaping wound discharged pus profusely. The temperature fell to normal for a day or two but rose to 101° F. on the 9th day when the wound was suppurating still more freely. A pure culture of *Staph. albus* (coagulase-positive) was grown from the pus.

On the 12th day after operation there was an elliptical wound, 5 in. long and 2 in. wide and about 1 in. deep, covering the vertebral border of the scapula; it was covered with a thick purulent exudate. It was cleaned and packed lightly with sulphathiazole (2 g.). The temperature fell to normal the same day and remained there. By the 2nd day of treatment the wound was already much cleaner. A further application of 2 g. of sulphathiazole was made and the treatment was repeated every 2 days until the 14th day. On the 4th day suppuration had practically ceased and signs of healing were present at the upper and lower poles. The wound continued to heal rapidly and by the 11th day it was bridged across at its widest part by a band of granulation tissue largely covered with epithelium. *Staph. albus* (coagulate-positive) in pure culture could still be grown. Progress was uninterrupted from now on and by the 14th day there was no sign of clinical infection. There was an exuberant growth of granulation tissue which appeared to prevent complete epithelialisation. However, after occasional cauterisation with silver nitrate, the wound was completely epithelialised by the 24th day. The patient was discharged 28 days after operation with the wound completely healed.

ANALYSIS OF CASE-HISTORIES AND FINDINGS

At the start we intended to treat only those infected wounds which had shown no improvement with other treatments over a long period. It was however impossible to find sufficient cases of this kind and there are only 4 out of 15 (cases 1, 7, 8 and 11) which were of very long duration. In 6 the infection persisted without improvement for periods of 17–28 days and the remaining 5 were of from 4 to 12 days' duration. The main factors in the choice were that the wound should be large, severely infected and showing no signs of response to the prescribed treatment. Up to the time of beginning local sulphathiazole we had no responsibility for the treatment. A fair number of small infected lesions such as boils, bed sores, &c. were also treated with excellent results but we have only included wounds so severely infected that a rapid response to treatment would be of possible therapeutic significance.

In every case the infection had been treated by other methods before the local application of sulphonamide. Local treatments included immobilisation in plaster, fomentations, antiseptics, cod-liver oil dressings, and combinations of these. The majority (10 out of 15) had received oral or intravenous sulphonamide, usually in full doses. In 2 only (cases 10 and 15) this was continued for a few days after the local sulphonamide treatment was started. Signs of systemic infection usually abated but the local infection persisted or even developed in spite of the oral treatment. In some instances (cases 3, 4, 5, 6 and 13) the operation wound, which was not clinically infected at the time, was packed with sulphanilamide. It would appear that a single prophylactic application, at any rate in a patient infected elsewhere, may be useless, and under these conditions vigorous local treatment should be continued, if possible, until definite signs of healing appear.

It was hoped to find comparable infected wounds in the same person, one of which could be used for a control treatment, but the difficulties are great, as is illustrated by the only possible case (13) in this series. Two below-knee amputation stumps were infected but one wound was much more extensive and much more severely infected, and showed a much heavier growth of *Staph. aureus* than the other. It was impossible accurately to assess the value of two treatments under such conditions. It should be noted that, in this one case, sulphanilamide instead of sulphathiazole (owing to a temporary stoppage

in supplies) was used, and our impression was that the response was not so impressive as in similar cases treated with sulphathiazole. Another severely infected (anaerobic streptococcus) amputation stump, not included in this series, also rapidly responded to sulphathiazole after a very slow response to 2 weeks' treatment with sulphanilamide.

Wound cultures were made at short intervals immediately before the application of sulphonamide. Although duplicate cultures were made in media containing *p*-aminobenzoic acid, the same types of bacteria were always grown in both cultures. Care was taken not to grossly contaminate the swab with sulphonamide and it seems that the small amounts occasionally conveyed to the media were never sufficient to inhibit growth.

In only 4 of 15 cases did the organism considered to be primarily responsible for the infection disappear completely during the course of treatment (see table II). A pathogenic staphylococcus was the commonest primary infecting organism in this series (10 of 15), and in only one instance (case 6), did the treatment apparently result in the destruction of all the organisms present. Bacteriological evidence of infection continued until the wound healed in 2 out of the 3 cases (2, 4 and 8) infected with the *Strep. hæmolyticus*. In both instances in-vitro tests showed that they were somewhat more resistant to the action of sulphanilamide, but only slightly, if at all, more resistant to sulphathiazole 14 days after the treatment was begun. In the single cases in which *Clostridium welchii* (5) and *Ps. pyocyanea* (12) were considered to be the primary infecting agents the organisms could no longer be grown after 23 days treatment. No wound became completely free of potential pathogens until healing was in an advanced stage.

There was no obvious relationship in the early stages of treatment between the amount of growth on plate cultures and the rate of decline in signs of clinical infection. When signs of infection had mainly disappeared the plate growths were usually not so heavy, but they gave little information about the related clinical condition. This was obviously due to the crudity of the method, and if accurate bacterial counts on a wound surface were possible there is little doubt that they would show a progressive diminution during treatment. The ordinary routine methods of culture are of little value for assessing progress, and from the clinical standpoint numerous cultures are a waste of effort. On the other hand, if the clinical infection fails to subside under treatment, in-vitro tests of the resistance of the infecting organism to the sulphonamide used, as compared with that when first isolated, should be of real value in deciding whether to change the form of treatment. If the resistance was high, another sulphonamide to which the resistance of the strain was shown to be less, or better, one of the new " biological " antiseptics, should be used. No occasion for this change occurred in any case in our series.

Determinations of the blood sulphonamide content were not made in all the patients, since it is already well established (Hawking 1941) that the figure never rises very high compared with that following oral administration in adequate amounts. The maximum concentrations reached ranged between roughly 1 and 2 mg. per 100 c.cm. (see case 4 report). The rate at which sulphathiazole is absorbed from the wound is not rapid enough to produce high blood levels. This no doubt accounts for the fact that not one patient showed any toxic symptoms. When it is appreciated that the amount of sulphonamide absorbed was usually less and rarely more than 1 g. per day, this finding is not unexpected.

Two noteworthy features in the healing process were considered to be related to the treatment. First, there was a tendency in many cases to capillary hæmorrhage at the edges of the wound. The bleeding was sometimes sufficient to suggest a secondary hæmorrhage but no large vessel was involved, though it was sometimes necessary to insert a suture. Secondly, the formation of granulation tissue often seemed to be exuberant and in some instances the tissue projected well above the surface of the wound. It seemed to us that the presence of sulphathiazole was responsible for this excessive growth of highly vascular granulation tissue, which bled very easily and in a few wounds appeared to hinder epithelial growth. In cases 12 and 13 it was necessary to complete healing by skin grafting ; it was noteworthy how quickly the graft took and healed. Mellon, McKinney and Rack (1942) found that sulphathiazole stimulated tissue-culture growth, and they suggest that stimulation of wound healing may be a partial explanation of the superiority of sulphathiazole in local staphylococcus infections.

TREATMENT OF SEPTIC FOCI WITH WARM SATURATED SULPHONAMIDE SOLUTIONS

Green (1940) pointed out that bacteria which had been exposed to sulphanilamide were much more sensitive to the lethal action of heat. Sulphanilamide was completely inactive at 0° C. and there was a progressive increase in its bactericidal action as the temperature rose. In the range 37°–40° C. this increase in activity, using the same concentrations of sulphanilamide, was very striking. It was indicated that this fact might have a clinical application. Theoretically the application of a warm saturated solution of sulphonamide should greatly increase its effectiveness, mainly by increasing the local temperature but partly by increasing the concentration of the drug.

The idea was tested by treating septic wounds of the fingers and hands in baths of sulphonamide solution. The patient immersed the whole hand in a saturated aqueous solution (cir. 1/90) of sulphanilamide sufficient to completely cover the septic wound and maintained at a temperature of 110°–120° F. The period of immersion was 1–2 hours and it was repeated at 4-hour intervals. The total period of immersion had to be determined individually so as to prevent the skin from becoming too waterlogged ; the maximum daily period was 6 hours.

Four grossly septic fingers and one septic hand, all of which had been freely incised and treated by immobilisation and acriflavine dressings for periods of 5–21 days without improvement, were given sulphanilamide baths. In four of the five cases so treated improvement was progressive from the start, and within 4–10 days clinical signs of sepsis had gone and further surgical treatment (amputation or sequestrectomy) was carried out successfully. In one patient with a septic hand the surface infection improved rapidly but it was necessary to make further incisions after 16 days treatment, after which rapid healing occurred. Obviously, when the infected focus is not freely communicating with the surface the treatment is unavailing. The result in one severely infected finger of long duration, which was treated in saturated sulphathiazole baths, was the most impressive of all, for the infection resolved in 5 days and amputation was done with safety 2 days later.

We have lately extended the scope of this method by treating more varied types of infected wounds by allowing a saturated aqueous solution (cir. 1/900) of sulphathiazole at a temperature of 110° F. to drip upon the open wound. The treatment is given for a continuous period of 1½–2 hours daily at the rate of 2 drops per second from a height of not more than 4 in. After the treatment loose debris and sloughs are carefully removed and the area covered with sulphathiazole powder.

Only a few cases have yet been treated in this manner but our impression is that the rate of improvement is greater than with any other method we have tried. In one grossly septic amputation stump (20 days duration) with a bacterial flora of *Staph. aureus*, an anaerobic streptococcus and *B. subtilis*, local treatment with sulphanilamide powder for 16 days had no obvious effect ; 5 days further treatment with sulphathiazole powder caused a slight improvement, but when this was reinforced with the drip treatment there was a striking improvement within 3 days.

This aspect of the investigation is in its preliminary stages and the full details of our treatments with various sulphonamides will be reported later. It is only mentioned because we think the early results justify its trial elsewhere, and rapid assessment of its value is of some urgency.

CONCLUSIONS

The number of cases does not warrant any attempt at a statistical analysis of the details. The main and important observation is that all, without exception, of 14 severely infected wounds showed an early and progressive response to energetic and sustained local sulphathiazole treatment. In the majority of cases this

was evident during the first 3 days and in no case was obvious improvement delayed more than 13 days. The rapid diminution in the amount of pus discharged and the coincident appearance of healthy granulation tissue never failed to impress us and it was usually possible to foretell by the general appearance of the patient after a few days treatment that the wound infection was subsiding.

It cannot be denied that the same results might have been achieved by other methods. It should however be recognised that most of these cases had previously been treated by other methods, both local and general, including vigorous systemic treatment with sulphonamides. The failure of oral sulphonamides to influence the local infection was very obvious in many of our cases, though it should be noted that the infecting organism was commonly *Staph. aureus* and that the sulphonamide used was either sulphanilamide or sulphapyridine, neither of which are very effective against this organism.

The most impressive results in this series were, as would be expected, in purely surface infections. In recent cases of this kind, treated with the warm sulphathiazole drip, the results were outstandingly good. Where there is deeper sepsis it is obviously of great value to clear up the surface infection, so that surgical access is made safer. We were only concerned with establishing the efficacy of local treatment, but there seems little doubt that, where the primary focus is deep as in chronic osteomyelitis, the treatment should embrace all the infected areas that can be made accessible by operation, provided that the treatment can be intensive and continuous. It should not replace, but only be ancillary to, the purely surgical measures necessary to ensure adequate drainage or removal of necrotic tissues.

Reviewing the results as a whole, it seems that local sulphonamide is the treatment of choice for a purely local infection, provided there is efficient access. Certainly, at the present time, there is no reason to consider any other local antiseptic treatment until sulphathiazole has been given an adequate trial. Undoubtedly still more effective compounds will be produced, and provided they are shown experimentally to have greater antibacterial powers, and to be no more harmful than sulphathiazole to the tissues, they will no doubt be used as they become generally available. But in view of the excellent results we have obtained we recommend that, in the present emergency, sulphathiazole or sulphadiazine, which appears to have very similar properties, should be the sulphonamide generally adopted for the prophylaxis or treatment of local infection. Penicillin and other powerful "biological" antiseptics like gramicidin may later displace the sulphonamides, but at present their place in local treatment appears to be where sulphonamide-resistant bacterial strains have developed in the wound.

Although we have concentrated on the treatment of established infection the results have an obvious bearing on prophylaxis. There is no space to consider it here, except to state that it is obviously just as important to use the most potent sulphonamide available in prophylaxis as in established infections, if unnecessary investigations are to be avoided.

Finally it must be stressed that the treatment in no wise displaces accepted surgical measures and of course is of no value in sepsis below an unbroken surface. A lack of understanding of the principles underlying the treatment is the main reason for the clinical arguments as to the relative merits of surgical and sulphonamide treatment. Obviously they are complementary, though when intelligently used local sulphonamide treatment may often make further operative treatment unnecessary, or, as in many of our cases, enable it to be carried out safely, where it had previously been a hazardous procedure dictated by life and death considerations.

SUMMARY

The mode of action of the sulphonamides is discussed in relation to their local use in the treatment of established infections.

Fourteen grossly infected wounds, many of which had failed to respond to other treatments, including sulphonamides by mouth, were treated by the intensive local application of sulphathiazole.

The clinical infection rapidly subsided under treatment in every case, though usually the causative organism was not eliminated.

Preliminary trials with the local application of warm saturated sulphathiazole solution suggest that it may prove an efficient method of treating local sepsis.

In routine clinical work at the present time, no other local antiseptic treatment of infected wounds should be attempted before the sulphonamides, preferably sulphathiazole, have been given an adequate trial.

The expenses of this work were defrayed by the Medical Research Council and one of us (T. P.) is in receipt of a whole-time personal grant from this source.

We are indebted to Mr. Holdsworth who permitted us to treat his cases, and to Professor Wayne, both members of the team investigating the treatment of shock and war wounds in Sheffield, and to Dr. Hermitte for his assistance in bacteriological and photographic work.

Messrs. May and Baker gave us the sulphathiazole used in the early part and Messrs. Ciba that used in the latter part of the investigations, and to both our thanks are due.

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PHOLEDRINE IN THE PREVENTION OF OPERATIVE SHOCK

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IN many surgical operations shock of varying degree occurs; in most cases it is mild and of short duration, disappearing spontaneously as soon as the operative manipulations or the anæsthetic are completed. In more severe cases, shock can be controlled with the routine anti-shock measures combined with speed in the completion of the operation. There remain some cases, however, where the patient is old or anæmic, or when long extensive operation is needed, in which severe shock becomes probable rather than possible, and its control a matter of much greater anxiety. It is in regard to this latter type of case that we should like to record our clinical experience with the drug pholedrine,* which though reported on favourably by Dodd and Merton (1939) and Dodd (1940, 1942) appears to have escaped the wider recognition it deserves.

We have used it prophylactically to prevent the onset of shock (its use has been disappointing in fully developed shock); and in "bad risk" patients, in whom severe shock is likely to develop despite adequate treatment (blood-transfusion, plasma, &c.). It is imperative to estimate the blood-pressure repeatedly. A falling blood-pressure is the most constant concomitant of developing shock; we have aimed at preventing it by keeping the blood-pressure within 10%–15% of the normal pre-operative level, and it is only by observation of the blood-pressure every 10–15 min. that this control can be exercised.

The drug can be given subcutaneously, intramuscularly or—if rapid action is desired—intravenously, and in our experience it may be repeated many times without any weakening or suppression of its biological action. Experimental evidence on this point is conflicting, however (Rietschel 1939, Roberts and Ginader 1938). We found no harmful action on the heart, but reports on its cardiac effect are rather variable. Some workers

* The pholedrine used in this investigation was 'Stimatone' (Ward, Blenkinsop & Co.).

(Klostermeyer and Jonsson 1937, Parade 1938, Schoenwold et al. 1940, Reis 1940) have demonstrated abnormalities of the electrocardiographic rhythm and complexes, while others maintain that it improves the coronary circulation and stroke output of the heart. Many of these experiments were conducted on animals, and in one case at least the anæsthetics used were chloroform and cyclopropane—the latter being especially noted for producing arrhythmias.

Pholedrine seems to have a longer and more positive action than adrenaline, ephedrine and other vasopressors, and although it might be anticipated that a patient whose blood-pressure had been continuously stimulated during an operation would tend to collapse when the stimulant was removed such has not been our experience; blood-pressure readings, continued postoperatively for many hours, have been remarkably constant. We have used pholedrine with both inhalation and spinal anæsthetics. With spinal anæsthesia our method of administration is as follows. Pholedrine 0·5 c.cm. is given 10 min. before the spinal injection ; should there be a significant drop in blood-pressure a further 0·5 c.cm. is given subcutaneously, and the blood-pressure is brought back to within normal limits. If the fall has been more profound the blood-pressure can be more readily restored by giving 0·25 c.cm. of pholedrine intravenously followed by 0·5–0·75 c.cm. subcutaneously.

In our earlier cases we tended to give doses which were too large and the blood-pressure would rise dramatically to 20–30 mm. Hg above the preoperative level, confirming the observation of Dodd (1942).

CASE-RECORDS

The following 10 cases illustrate the value of pholedrine. In all of them, despite the fact that they were extremely severe operations on patients who were poor operative risks, we were impressed by the control we had over the blood-pressure and the ease with which it could be made to return to normal, even after long operations.

1.—A man of 33 with gastric carcinoma. He was thin with visible peristalsis and a palpable mass. Condition fair. Preoperative blood-pressure, 115/85 mm. Hg. Anæsthetic : spinal 'Percaine,' 1/1500, 12 c.cm.; 'Pentothal,' 0·6 g.; nitrous oxide and oxygen. Resuscitation : blood-transfusion during operation, 540 c.cm. Total pholedrine used 2·25 c.cm. (1·5 c.cm. intramuscularly, 0·75 c.cm. intravenously). Operation : partial gastrectomy. The operation took 150 min., but the blood-pressure was maintained and at the conclusion was 115/90 mm. Hg. When pholedrine 0·25 c.cm. was given 90 min. after the beginning of the anæsthetic the blood-pressure was raised to 150 mm. Hg systolic (fig. 1). Uninterrupted recovery ; after 5 months was very well.

2.—A man of 34. Admitted for acute obstruction by bands. Operation under spinal anæsthesia (percaine) ; 18 in. of gut found to be obstructed but viable, and after division of band the abdomen was closed. Three days later onset of pain and palpable mass in left iliac fossa. Rising pulse-rate, vomiting, general condition poor. Blood-pressure 110/80 mm. Hg. Anæsthetic : pentothal (0·25 g.) induction followed by cyclopropane. Resuscitation : intravenous saline. Pholedrine continued after return to ward. Oxygen by BLB mask on return to ward. At operation 18 in. of gut was found to be gangrenous owing to a mesenteric thrombosis ; this was resected and anastomosis attempted between two ends of ileum. As the distal part had been injured and had to be invaginated it was decided to perform an anastomosis between the proximal ileum and transverse colon. The operation took 90 min. Blood-pressure was maintained throughout by two injections of pholedrine 0·5 c.cm. On return to ward there was some fall of blood-pressure corrected by two further injections of pholedrine, 0·5 c.cm. subcutaneously. Condition after 48 hr. satisfactory. Patient died later from peritonitis (fig. 2).

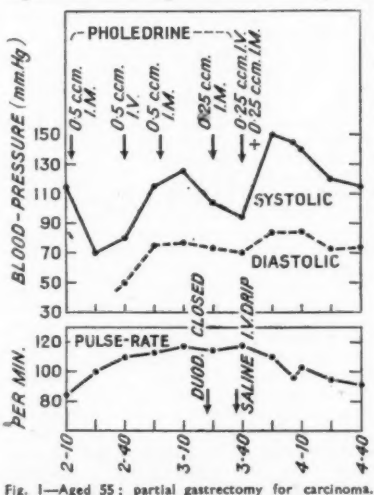

Fig. 1—Aged 55 ; partial gastrectomy for carcinoma. Anæsthetic : percaine 1/1500, 12 c.cm. ; pentothal 12 c.cm. with nitrous oxide and oxygen.

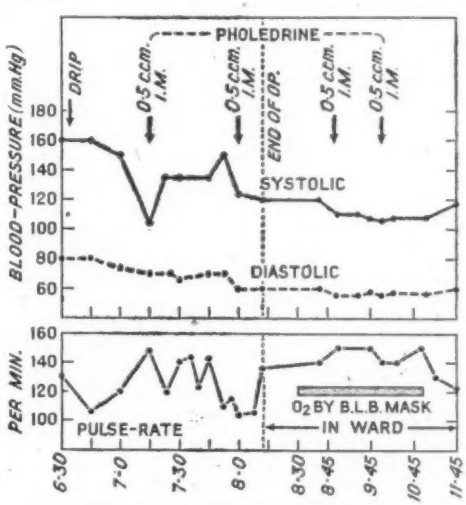

Fig. 2—Aged 34 ; resection of small gut for mesenteric thrombosis. Anæsthetic : pentothal 0·25 g. and cyclopropane.

3.—A woman of 47. Thyroidectomy a month before for severe thyrotoxicosis when the electrocardiogram showed some slurring of the QRS complex. Condition had much improved but was still retarded by an enormous ovarian cyst which was embarrassing respiration. Anæsthetic : bromethol, nitrous oxide, oxygen and ether. Resuscitation : intravenous saline ; pholedrine. Operation : ovariectomy. Blood-pressure at start 140/100 mm. Hg. After 60 min. blood-pressure fell to an unrecordable level. Pholedrine 0·5 c.cm. restored the blood-pressure to normal, and after a further slight fall it was maintained by a further injection of 0·5 c.cm. intramuscularly. Uninterrupted recovery.

4.—A woman of 72. History of coronary thrombosis 3 months before ; preoperative electrocardiogram showed sinus tachycardia, T 3 inverted, left axis preponderance. Blood-pressure 160/80 mm. Hg. Chest : basal crepitations. Hæmoglobin 86%. Anæsthetic : spinal percaine, 1/1500, 10 c.cm. ; pentothal 0·25 g. ; gas and oxygen. Resuscitation : pholedrine. Operation : vaginal hysterectomy. After administration of anæsthetic blood-pressure fell to 100/15 mm. Hg despite pholedrine 0·5 c.cm. given intramuscularly 15 min. before. Further doses of 0·25 c.cm. intravenously and 0·25 c.cm. intramuscularly soon restored blood-pressure to 130/70 mm. Hg. A later injection of pholedrine 0·33 c.cm. intramuscularly restored blood-pressure to normal. Duration of operation, 80 min. Postoperative electrocardiogram showed no change. Uninterrupted recovery.

5.—A man of 49. Condition poor ; anæmic ; Hb. 38%. Palpable mass in abdomen. Previous gastro-enterostomy ; diagnosed as doubtfully operable carcinoma of the stomach. Given blood-transfusion preoperatively and Hb. brought up to 65%. Anæsthetic : spinal percaine, 1/1500, 13 c.cm. ; pentothal and cyclopropane. Operation : partial gastrectomy. Duration 180 min. Blood-pressure maintained by small injections of pholedrine and patient was returned to ward in fairly good condition. Uninterrupted recovery.

6.—A man of 57. Thrombocytopenic purpura. Developed profuse and widespread hæmorrhages and had to be given, in all, 4 l. of blood and 420 c.cm. of concentrated red cells before bleeding ceased and progress was made. Three months later Hb. 70%. Splenectomy. Duration 80 min. Anæs-

thetic: spinal percaine, 1/1500, 12 c.cm.: pentothal (continuous) 0·5 g. Resuscitation: pholedrine 0·25 c.cm. intravenously, 1·25 c.cm. intramuscularly. Blood-pressure 110/80 mm. Hg at start of operation; fell after ½ hr. to 85/40 mm. Hg. Pholedrine 0·25 c.cm. intravenously and then repeated doses of 0·25 c.cm. intravenously and 0·75 c.cm. intramuscularly, with restoration and maintenance of blood-pressure which at conclusion of operation was back to normal. Uninterrupted recovery.

7.—A man of 63. Developed suppurative cholecystitis while recovering from amputation of leg through thigh for thrombophlebitis obliterans. Previous lumbar sympathectomy for same condition. Blood-pressure 150/80 mm. Hg. Fat; poor myocardium. Râles at both bases. Anæsthetic: spinal percaine, 1/1500, 13 c.cm.; cyclopropane and oxygen. Resuscitation: pholedrine. Operation: cholecystotomy. Duration 45 min. At start there was a sudden fall of blood-pressure which was quickly restored by pholedrine 0·5 c.cm. intravenously and was maintained by 2·5 c.cm. intramuscularly in divided doses. After 30 min. operating a further fall to 100/65 mm. Hg was restored to normal by 0·5 c.cm. intravenously. Uninterrupted recovery.

8.—A woman of 52, air-raid casualty. Multiple injuries, including one perforating peritoneum. On admission, blood-pressure 115/78 mm. Hg; pulse-rate 70. Given 400 c.cm. of plasma; 2½ hr. later blood-pressure 140/78 mm. Hg; pulse-rate 72. Taken to theatre: wounds, including abdominal wound, explored and treated. Duration 135 min. Anæsthetic: pentothal, 1·5 g. (continuous), nitrous oxide and oxygen. Resuscitation in theatre: further 200 c.cm. serum intravenously; pholedrine. Blood-pressure at conclusion of operation 155/80 mm. Hg. Uninterrupted recovery.

9.—A woman of 51. Symptoms of obstruction and irreducible femoral hernia for 12 hr. Pale, dehydrated, vomiting. Operation: femoral sac incised but as obstruction was released bloodstained fluid flowed from general abdominal cavity. Laparotomy showed strangulated dead gut over large caseous gland. Resection of gut. Duration 195 min. Anæsthetic: spinal percaine, 1/200, 2 c.cm.; cyclopropane. Resuscitation: saline; pholedrine. Uninterrupted recovery.

10.—A man of 59. Perforated duodenal ulcer for third time. Condition fair but dehydrated. Operation: suture of perforation and gastro-enterostomy. Duration 120 min. Condition maintained throughout. Anæsthetic: hexobarbitone 0·5 g.; cyclopropane and oxygen. Resuscitation: intravenous saline; pholedrine. Uninterrupted recovery.

DISCUSSION

We have used pholedrine in cases in which owing to the state of the patient or the extent of the operation shock has been likely to develop. We have hoped to avoid irreversible or profound shock by keeping the blood-pressure as constant as possible and restoring it to normal as soon as possible. For this we have found pholedrine of great value. Once "irreversible" shock has developed pholedrine is of no value. We have not encountered this in our operation cases, but have seen it in severely shocked air-raid casualties and have found little or no response to pholedrine; unfortunately the records of these cases were either lost or not kept owing to the blitz. Pholedrine does not replace adequate preparation of the patient preoperatively by blood-transfusion, saline infusion or other necessary measures. Similarly, if pholedrine is to have its full effect during operation the blood-volume must be maintained by transfusions of blood or plasma, or by intravenous infusions. Under these conditions we have not found it necessary to use any other cardiac or respiratory stimulant.

We wish to thank our colleagues at St. George's Hospital for their coöperation during this investigation.

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THREE CASES OF LOCKED TWINS

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THE locking of twins is rare, though the number of cases published in the past few years seem to indicate that it is getting less so. This might be expected if it is true that ordinary twin pregnancy is becoming more common. The only statistics which I have been able to discover are those of Von Braun (quoted by Eden and Holland 1937), who from Viennese figures estimated that it occurred once in 90,000 labours. This gives a rate of 1 in every 1000 twin labours. Many obstetricians of wide experience have never encountered the condition, and I must account myself fortunate in having treated three cases in the past six years.

There are five ways in which locking or collision may happen. The fœtuses are usually small or the pelvis very large.

1. The fœtuses both presenting by the vertex, their heads enter the pelvis side by side and become arrested. If, however, the heads are very small, spontaneous delivery may ensue. The treatment is to push up the heads above the pelvic brim, if possible, and deliver the babies separately, as a rule by forceps extraction. Firm impaction may necessitate craniotomy of one or both heads before delivery can be effected.

A case of this type was reported by Commandeur and Eparvier (1923). They were able to reproduce the condition found, since the fœtuses though stillborn were not mutilated, and they published a photograph showing the manner in which the head of the second twin fitted the neck and shoulder of the first. Phillips (1926) reported a similar case, where the impaction of the heads was such that disengagement was impossible. He perforated the cranium of the first fœtus, severed the neck and removed the head before he was able to push up the trunk and deliver the second child. Both fœtuses were macerated. The mother made a good recovery. Dawson (1936) also reported such a case and since the diagnosis was made before the os was fully dilated and both babies were alive he performed a lower segment cæsarean section, saving both children. The puerperium was uneventful.

2. The first child presents by the breech, the second by the vertex: the heads either become impacted in a manner similar to that of the previous type or become locked by the chins. Rarely, spontaneous delivery may take place.

McClintock (1876) cited two cases in which nature succeeded in overcoming the obstacle. In rare instances, the chins may be disengaged by internal manipulation and delivery completed. Moore (1933) was able to do this by a process of rotation and traction, and delivered the second child alive. Here, the delay arose when the feet of the first child presented at the vulva in a footling presentation—i.e., the fœtus was still high in the pelvis—and this probably accounted for the ease with which delivery was effected. More often the heads are firmly fixed in the pelvic brim or cavity and cannot be disimpacted. There are then two courses open. Since the first child is known to be dead, it may be decapitated, the trunk removed and the head pushed up, when the second fœtus can be delivered by forceps and the first head ultimately removed. Or the head of the first child may be perforated through the mouth and extracted, this method being suitable only in cases in which collision and not locking has occurred. McClintock (1876) mentions one case in which decapitation was performed "with a bass string wrapped round with wire of a pianoforte." I learn that, adopting a similar principle, even the unmusical may perform decapitation with a wire such as is used in a Gigli saw passed around the neck by means of a Blond-Heidler needle. Severance of the neck with embryotomy scissors can be a tiring and difficult process, as I discovered, with the hand confined within a fully occupied pelvic cavity. The decapitation hook is not designed for, and is valueless in, this type of case.

3. The breech of the second child, with the legs flexed, enters the brim at the same time as the thorax of the first child, also presenting by the breech, preventing further progress of the first child, whose head remains above the brim.

This happened in the third of my cases, but I have not seen it described previously. I would have expected this type of locking to be relatively common, and no doubt such cases have been recorded which I have overlooked in my necessarily limited survey of published work. Further progress in such a case, if it could take place, might result in a double footling presentation as described below (type 5). Spontaneous delivery would be very unlikely, although treatment proved relatively simple.

4. The first child presenting by the breech or the feet may become locked by the chin on the body of the second child, lying transversely. Natural delivery is impossible. Decapitation of the first twin should be performed, and an effort made to save the second by version and extraction.

Ackermann (1920) reported a case in which the lower fœtus presented transversely by the shoulder, while the head of the second was lying in the pelvis, the arm of the transverse twin preventing descent of the second head. By pushing up the arm above the brim he was able to extract the second child with forceps; afterwards an internal version was performed on the first, around which the cord was looped in a complicated fashion. Both children survived.

5. Both fœtuses presenting as footlings may enter the pelvis together.

Again McClintock (1876) is my source of information, and I can do no better than quote his own words:

"Of the other variety of bifœtal presentation Amand relates a case where he found three feet presenting. By careful examination he ascertained the two belonging to the same fœtus and brought them down. . . . Dr. F. H. Ramsbotham was once called to a case where a leg of each child was beyond the vulva. 'Although they were right and left,' he remarks, 'I immediately detected by the direction of the toes that they belonged to different bodies: by gently pushing up one, and careful traction at the other leg, I extracted each breech from the brim of the pelvis and both children were born living.'"

Few cases of this type can end as happily as this last—embryotomy is usually the fate of both children. Smellie himself, with his vast experience, makes no reference to this complication of twin labour, and it must therefore be assumed that he never saw such a case.

CASE 1

A primigravida, aged 21, was admitted to hospital on Feb. 19, 1936, in the 38th week of pregnancy according to her dates. Though dirty and self-neglected, she appeared healthy; she was a heavily built, unintelligent girl who had had no antenatal care. Apart from a moderate rise in blood-pressure she had no toxæmic manifestations. External measurements were large, and the uterus was the size of a full-time pregnancy. A presenting part was in the pelvis, but the fœtal parts were indefinite and difficult to determine owing to tenseness of the uterus. At this time only one fœtal heart was made out, to the left of the umbilicus. On vaginal examination, the soft parts were normal. The pelvis was very large: the promontory was not reached and the outlet was normal. The presenting part was difficult to determine because she resisted examination, but was thought to be a small breech. An X ray revealed twin pregnancy, the first fœtus presenting by the breech with legs flexed and back to the left, the second—a smaller fœtus—presenting by the vertex with back to the right.

Labour came on at 1 A.M. on Feb. 20. At this time (the X ray having no doubt assisted localisation) two fœtal hearts were audible, one to the left and just below the umbilicus, the other to the right above the navel. Labour proceeded normally until 8.50 A.M., when the membranes of the first fœtus presenting at the vulva, were ruptured artificially and a foot presented; 30 min. later the buttocks were born, the sacrum to the left and anterior. Labour continued naturally until the umbilicus was born, when the cord was found to have stopped pulsating. The arms, which were flexed, were hooked out of the vagina, and traction applied to the legs, without causing any advance of the fœtus. At 9.45 A.M., with the patient anæsthetised, I passed a hand into the vagina, which was unusually capacious, and into the uterus posteriorly. I found that the chin of the first fœtus, pointing to the right, had become locked with that of the second, lying towards the left. The two heads were firmly wedged in the lower uterine segment, and could be felt lying together on abdominal palpation. The second fœtal heart was still audible. The neck of the first twin felt elongated, no doubt as a result of efforts at extraction. I was unable to push up the head of the first fœtus, or otherwise disimpact the chins, and therefore decided to decapitate the first fœtus in an endeavour to save the second. The cord was severed between forceps. Since the vagina, though roomy, was uncomfortably tight for the hand in its upper part, the first fœtus was rapidly eviscerated through the abdomen, the thoracic contents being drawn out through the diaphragm. I then passed my left hand along the back of the fœtus, between it and the anterior vaginal wall, and my index and middle fingers over the shoulders, as in shoulder traction. A stout pair of curved scissors, similar to those used for morcellement, was then passed upwards between the hand and fœtal back, and, with my fingers protecting the maternal tissues from the blades, I severed the neck in the lower cervical region. The trunk being thus removed, the head was readily pushed up past the second fœtus after a long vulsellum had been attached to the cut tissues of the neck. The head of the second fœtus was then brought manually into the pelvic cavity, light forceps applied, and the child delivered in the left occipito-anterior position, complete in its membranes. The sac was very lax and contained almost no liquor, so that I had previously thought them to be ruptured. The child was very small and in a profound state of shock; it did not survive its birth, for respiration was never established. A second vulsellum was attached to the neck of the first head, which was then easily delivered by traction. The placenta, of the fused binovular variety, was delivered 8 min. later. The uterus contracted well without abnormal loss. There were no soft-tissue lacerations.

The operation occupied 1 hr. 10 min. The patient's condition after these tedious manipulations was excellent, her blood-pressure being maintained at 136/80 mm. Hg. Both fœtuses were female. The first, without the viscera, weighed 4 lb. 10 oz., and the second 2 lb. 13 oz. No other measurements were recorded. The puerperium was normal in every way. The patient left hospital on the 12th day after delivery, at which time involution was proceeding normally, although the uterus was still somewhat bulky. She did not return for postnatal examination.

CASE 2

A recently widowed primigravida, aged 34, auburn-haired, highly strung and of good physique, first attended my antenatal clinic on March 2, 1937, when 25 weeks pregnant. I found no physical abnormality, and the blood-pressure and urine were normal; but the uterus was the size of a 28 weeks pregnancy. She attended the clinic until April 12, when she began to complain of headaches, vomiting, and swelling of the legs. I admitted her, since her blood-pressure was 150/80 mm. Hg, and she had gross œdema of the legs and feet, though the urine was normal. By her dates she was 30 weeks pregnant, but the uterus was the size of a 34 weeks gestation. It was tense, and the fœtal parts indefinite. What I took to be a head was above the brim, but to the left of the umbilicus was another ballottable part which felt like a second head. A fœtal heart was heard to the right of the umbilicus, and another at the fundus, though there was little difference in the rates. X rays confirmed the presence of twins. One fœtus lay in the right oblique position with its head just above the brim, the other at a much higher level, with its head to the left of the umbilicus and the breech at the right fundus, the back occupying the fundus to the left.

The patient improved rapidly and was able to leave hospital 6 days later, but in a week was readmitted with similar toxæmic symptoms. The blood-pressure was now 180/100 mm. Hg, and there was albumin in the urine. Despite drastic treatment she improved only up to a point: the albumin never quite disappeared from the urine, and the blood-pressure was never below 130/80 mm. Hg. Urine sterile; no casts. Blood-urea normal.

On May 21, 26 days after admission, I decided to induce labour. The uterus was the size of a full-time pregnancy, and the pelvis roomy. I found a breech entering the pelvis, head at left fundus, back to the left; the other child was a vertex with head in the right iliac fossa and back to the right. Both fœtal hearts were normal. There had thus been a considerable readjustment of the fœtal positions since the X ray had been taken. Three doses of quinine sulphate, gr. 5, were given at 2-hourly intervals, the last dose at 12 noon Labour started with vague pains at 12.30 P.M., becomin

stronger by 1 P.M. when I saw the patient and was satisfied with her condition. For the next 12 hours I was absent from hospital, and this part of the story was reported to me by the nursing staff and by a colleague who was called in. At 1.30 P.M. the patient vomited, but seemed to be progressing normally. She was transferred to the labour ward at 3 P.M.; blood-pressure 210/130 mm. Hg. Shortly afterwards she collapsed; she was pale and cold, with pulse-rate 56 per min. Both fœtal hearts were slow. The labour pains almost disappeared. At 7 P.M. the patient's general condition was the same. The fœtal hearts could no longer be heard. Pains weak and irregular. On rectal examination the breech was in the upper pelvic strait, and the os 2–3 fingers dilated. The membranes ruptured shortly afterwards, and at midnight a foot appeared at the vulva. At 12.30 A.M. on May 22 I saw her again. She was in a desperate condition and looked profoundly shocked. She was pale, with a cold, moist skin and clammy extremities despite numerous hot bottles. Pulse thready, 154; blood-pressure 194/148 mm. Hg. I concluded she was suffering from some unusual toxæmic manifestation, but have since thought this must have been a case of quinine idiosyncrasy, as a colleague suggested at the time. Treating her for toxæmia, I removed 15 oz. of blood by venesection and replaced it by 150 c.cm. of 50% glucose-saline solution and 10 c.cm. of 10% calcium lævulinate; after this I gave morphia, gr. ¼. She appeared a little better; her pulse-rate fell to 136, and her blood-pressure to 160/110 mm. Hg. At 3 A.M. she vomited 10 oz. bloodstained fluid. Morphia, gr. ¼ was repeated, and she slept for short periods. At 5.30 A.M. she again vomited bloody fluid. Blood-pressure had fallen to 144/124 mm. Hg. Occasional pains, with slow advance of the fœtus; general condition stationary. At 8 A.M. the breech was born to the umbilicus. An hour later her general condition was deteriorating; her blood-pressure was only 110/90 mm. Hg and pulse-rate 144. Morphia, gr. ¼, and a subcutaneous saline were given. An hour later there was no improvement, and I gave her 30 oz. of gum saline with 10% glucose, with improvement which was maintained. Labour pains had disappeared. At noon the pains recurred and were now much stronger. The body was born as far as the costal margins, but then progress became arrested despite increasingly strong pains. On abdominal examination I found that the heads had become locked together above the brim, the head of the second fœtus lying lower than that of the first whose body was already partly born. By abdominal manipulation I could not disengage the second head from above the pelvic brim into the right iliac fossa, and therefore decided, with some misgivings on account of her poor condition, to examine her under anæsthesia.

Under gas, oxygen and ether I passed my hand into the vagina posteriorly after bringing down the flexed arms, and upwards into the lower uterine segment. I found the head of the second fœtus lying transversely and extended with its face towards and wedged in between the shoulder and head of the first child. The neck of the first child and the occipito-frontal diameter of the second child occupied the transverse diameter of the brim. By pushing up the body of the first fœtus with my outside hand I was able to rotate the second head to bring the occiput to the front, which had the desired effect of disengaging the face from the root of the neck of the first child. After pushing the second head into the uterine cavity to the right, I readily extracted the head of the first child. The second bag of membranes was then ruptured artificially, releasing only a small amount of liquor, and the fœtus extracted with forceps. The placenta, of the fused binovular variety, was expressed 20 min. later. Ergometrine and 'Pitocin' (PDCo) were given and the loss was very slight.

Both infants were born dead. The first was a male, weighing 4 lb. 1½ oz., length 18 in.; the second a female, weighing 4 lb. 11 oz., length 19¾ in.

The patient's condition at the close of the operation—which only lasted 15 min.—was rather poor; blood-pressure 134/76 mm. Hg, pulse-rate 120. Continuous proctocylsis with 5% glucose solution in saline was instituted. The same evening I observed ecchymoses of the skin of the abdominal wall, at the sites of injection of the various drugs, and on the arm where the tourniquet had been applied before the intravenous injections. Since the onset of the acute illness, 24 hours before, the urine had contained much blood. Lederle's viper venom, 0·4 c.cm., was given intramuscularly and repeated later; there was no subsequent hæmorrhage. The patient, though she appeared to have cystitis, improved rapidly until the 9th day of the puerperium, when her lochia became offensive and gradually more profuse, though her general condition was good and there was no pyrexia. She was examined vaginally a day or so later, and a vesicovaginal fistula about ¼ in. in diameter, surrounded by necrotic tissue, was found about 1½ in. within the introitus. I could not account for its appearance in an area subjected to no trauma whatever during labour. The urine became normal with the administration of acid sodium phosphate, gr. 30 t.d.s., and I closed the fistula under spinal anæsthesia about four weeks after it was discovered. When seen a month later she was in good health and was passing urine normally. The fistula was completely healed, and both urine and blood-pressure were normal.

CASE 3

A primigravida, aged 24, was admitted in labour on Feb. 4, 1941. She was at term according to her dates, and said she had attended an antenatal clinic during the latter months of pregnancy. She had booked a midwife and was to have had her baby at home. Her last attendance at the clinic was 3 days before the onset of labour. Labour began with pains of a minor character at 1 A.M. on Feb. 1, but she did not call in her nurse until 6 P.M. two days later. The midwife examined her vaginally; there was no dilatation and the presenting part was high. A mild sedative was given. At 1.15 A.M. on Feb. 4 the os was fully dilated, and the midwife thought she felt "a hand in front of a vertex." She therefore called in a doctor, who examined the patient at 4.15 A.M., finding a foot presenting. He also diagnosed twin pregnancy, and sent the patient into hospital.

On admission, at 5.40 A.M., she was distressed. The pulse-rate was 130, the tongue furred and the mouth dry. There was considerable œdema of the legs and the face was puffy. Pains were strong and almost continuous. A foot was protruding from the vulva, but it did not descend with the pains. The uterus reached to within 2 in. of the ensiform cartilage. One head was palpable above the pubes in the midline, the other at the fundus to the left. Only one fœtal heart was audible, to the left of the umbilicus. I thought some kind of locking might have occurred. At 6.20 A.M. she was given 0·8 c.cm. of 'Heavy Percaine' intrathecally. A foot was protruding from the vulva, the legs and body of the first child occupied most of the pelvic cavity, with the back facing backwards; the cord was pulsating. The os was fully dilated. The pelvic brim was occupied anteriorly by the neck of the first child, while behind it the flexed legs and buttocks of the second child had descended just below the level of the brim, the legs being in front, occupying the nape of the neck of the first fœtus, and thus preventing the descent of the first head into the pelvic cavity. The membranes of the second fœtal sac were unruptured, but the amount of liquor was very small. The lower pole of the second fœtus was easily pushed up above the brim, so disengaging the legs from the nape of the first child. By traction on the presenting leg the head of the first baby was then brought into the pelvis and a living child delivered with moderate ease at 7 A.M. At 7.10 A.M. 5 units of pitocin were given, and the membranes of the second fœtus were ruptured artificially with escape of a small quantity of liquor. The breech engaged at once, and a living child was spontaneously delivered half an hour later. The placenta separated almost at once, and could be seen protruding from the vagina. It was therefore expressed, complete with membranes, five minutes later. Loss was scanty but ergometrine, 0·5 mg., was given intramuscularly. The placenta was of the uniovular variety, with separate amniotic sacs.

Both children were males and apparently healthy. The first weighed 3 lb. 15 oz., the second 4 lb. 5 oz. The first died on the 4th day, after a convulsion; permission for autopsy was not obtained. The second child was reared satisfactorily. The puerperium was uneventful.

DISCUSSION

The causes of twin locking can only be conjectured, but there are some conditions which undoubtedly predispose to it. Except in the very unusual type in which a limb of one fœtus enters the pelvic cavity and blocks the descent of the other, the pelvis must be large and the presenting parts small. A normal amount of liquor in each fœtal sac will probably prevent locking, and I believe we can go further and say that a deficiency of liquor in the second fœtal sac favours the accident. Dawson (1936) suggested that this might be so, having observed oligohydramnios in his case; Phillips (1926) made the same observation, and there was oligohydram-

nios of the second fœtal sac in all of my cases. Unfortunately the amount of liquor in the second fœtal sac is not specifically mentioned in most of the case-reports I have studied. Premature rupture of the second membranes might, I presume, predispose to locking.

It might be expected that mono-amniotic twin pregnancy would conduce to locking or collision of the fœtuses. Quigley (1935) denies that locking is commoner in such cases, but the total number of mono-amniotic twin pregnancies so far reported is little over 100. When one studies the disposal of the fœtus in cases of multiple pregnancy—the dovetailing together, as it were, of the babies in order to economise space—it seems remarkable that locking does not take place more often.

SUMMARY

Five common types of twin locking are described, and 3 cases reported in detail.

Predisposing factors are a large pelvis and relatively small fœtal parts, and oligohydramnios of the second fœtal sac may be important.

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PANCREATITIS AND DIABETES

RODNEY SMITH, MS LOND, FRCS
LATELY SURGICAL REGISTRAR AT THE MIDDLESEX HOSPITAL

THE normal function of any organ is liable to be affected adversely by gross destructive lesions. It is curious, therefore, that while there is little argument about the importance of the pancreas in the pathology of diabetes mellitus, most surgical textbooks, in discussing acute pancreatitis, pay little attention to diabetes as a possible complication. It is true that the part played by the pancreas is even now not fully understood, but there is no doubt that secretion of insulin is a property of the islets of Langerhans; since these are scattered throughout the pancreas, it seems reasonable to assume that if a large part of the pancreas is completely disorganised by disease the destruction of islet tissue should result in a diminution in the secretion of insulin. A recent case in which acute pancreatitis was associated with postoperative diabetic coma, with fatal results, prompted a study of the published cases to ascertain whether diabetes is an excessively rare complication of pancreatitis, or whether the possibility should be considered in every case and steps taken accordingly.

CASE-REPORT

A woman of 53 was admitted to the Middlesex Hospital with the following history, the salient points of which had to be obtained from relatives, owing to her poor condition. Until a week before she had been well. There were no significant illnesses in her history, except possibly one attack of jaundice 20 years ago, lasting "a week or so," and nothing to suggest previous diabetes mellitus. A week before admission she had been seized with severe abdominal pain, mainly epigastric but felt to a lesser degree over the whole abdomen. She stayed in bed, feeling very ill and in great pain, and unable to take anything but fluids by mouth; a doctor was not consulted until 5 days later, the pain now being worse and accompanied by abdominal distension and vomiting. She was admitted to hospital 2 days later with a diagnosis of peritonitis of unknown origin. Just before admission she had been given an injection of morphia, gr. ¼.

She was very drowsy, with pin-point pupils, but able to coöperate to a certain extent. Abdominal pain was still severe. There was no backache. Temperature was 103·4° F. and pulse-rate 116 per min. She appeared very ill and dehydration was well-marked. There was profuse, effortless vomiting of dark brown intestinal contents. The abdomen was grossly distended, with hyper-resonance, a little free fluid in the flanks and no diminution of liver dullness. There was generalised tenderness, most obvious in the upper half of the abdomen. On auscultation, peristaltic sounds were completely absent. Examination of the urine, removed by catheterisation, revealed no abnormality. The odour of the breath was such that had acetone been present it is doubtful if it would have been detected.

The patient was so obviously in extremis that it was impossible to make a certain diagnosis, but in view of the unmistakable ileus and the fact that the pain was mainly in the upper abdomen, the most likely diagnosis was thought to be diffuse peritonitis, probably caused by perforation of a peptic ulcer or the gall-bladder. Intravenous drip saline was started. The stomach was emptied of its foul intestinal contents by aspiration with a large stomach-tube, after which continuous suction-drainage was instituted with a Ryle's tube and a modified Wangensteen apparatus. The abdomen was opened by a midline epigastric incision, under local 'Percaine' field-block and light cyclopropane and oxygen anæsthesia. A little free peritoneal fluid found, but no peritonitis, though both large and small gut were greatly dilated. There was no fat necrosis. The cause of the ileus was not long sought, for on palpating the region of the pancreas, a mass about the size of a tennis ball was felt, apparently occupying the whole of this organ. When the mass was approached through the gastrocolic omentum, it was found to be tensely cystic, and a finger was easily inserted into a large abscess cavity from which was evacuated a considerable quantity of foul, stinking pus and several sequestra of necrotic pancreatic tissue. Culture gave a pure growth of *Bacterium coli*. The abscess was drained with a piece of corrugated rubber and 15 g. of powdered sulphanilamide was implanted locally. The patient did not regain consciousness from the anæsthetic, but passed straight into diabetic coma; 15 hours after operation acetone could be detected in the breath, and the blood-sugar was 420 mg. per 100 c.cm.; blood-urea 110 mg. per 100 c.cm. Measures to combat this unexpected catastrophe were at once instituted, but though temporary improvement at one point gave grounds for hope, and the blood-sugar was brought down to 111 mg. per 100 c.cm., she died 3 days after operation. Autopsy revealed that almost the entire pancreas had been destroyed; in addition she had portal pyæmia with multiple abscesses in the liver, and bilateral bronchopneumonia.

DISCUSSION

Though so little attention has been paid to diabetes as a complication of acute pancreatis, published cases show that disturbances of carbohydrate metabolism are common in cases of pancreatitis. In 1862 Harley described a case in which there was glycosuria, and Atkinson described a similar case in 1895. Fitz (1889), in his original papers on acute pancreatitis, does not mention diabetes as a complication. Körte (1911) reported 44 cases of acute pancreatitis, in 6 of which there was glycosuria. The evidence suggests that while glycosuria with acute pancreatitis is by no means rare, it is present in only a relatively small percentage of cases. Shumacker (1940) places this figure at 11%. If glycosuria is not common, most workers agree that hyperglycæmia is. Douglas (1933) placed little reliance on estimation of the blood-sugar as an aid to diagnosis, but Cole (1938) believes it can help; Brocq and Varangot (1937) collected 72 cases in which the blood-sugar had been estimated, and found that in 15 of these it was below 150 mg. per 100 c.cm., in 23 it was between 150 and 200 mg., and in 34 over 200 mg.

In most of these cases of glycosuria and hyperglycæmia the disturbance of carbohydrate metabolism was only temporary. There are, however, a number of reported cases in which true diabetes was caused by acute pancreatitis. Schmieden and Sebening (1937) analysed 1278 cases of acute pancreatitis, of which 624 survived and 18 developed diabetes. Shumacker (1940), in his exhaustive survey, collected 62 cases of diabetes caused by acute pancreatitis published up to that date; 25 developed diabetes during the acute illness, and of these: 6 died in diabetic coma soon after operation; 13 died of some other cause during the acute illness; 6 survived the acute illness, but 2 of them died of diabetic coma later; 37 cases developed diabetes, 4 soon after recovery from the acute illness, and 33 more than a year afterwards. According to Shumacker, there are also about 19 cases on record of acute pancreatitis occurring in patients previously known to be diabetics, all fatal but one. A smaller number of cases have been reported of

diabetes associated with cysts and pseudo-cysts of the pancreas (Donati 1932, Simsch 1932, Lebon and Loubeyre 1932, and others).

Disturbances of carbohydrate metabolism may also occur, though far less commonly, with chronic pancreatitis. Cases of this kind associated with glycosuria have been described by Mallet-Guy and his colleagues (1936) and by Plauchu and Loras (1935). True diabetes is even less commonly associated with chronic pancreatitis; Mosenthal (1937) associates chronic pancreatitis with the slowly progressive essential diabetes of Naunyn, while Sweeney (1931) recorded a case in which chronic pancreatitis with obstruction of the common bile-duct and main pancreatic duct led to obstructive jaundice and diabetes; cholecystojejunostomy cured both the jaundice and the diabetes. Less straightforward are the cases of Iberti (1940) and Ehrströhm (1932), in both of which chronic pancreatitis led to functional hyperinsulinism.

Some conclusions may be drawn about the incidence and importance of diabetes in inflammatory conditions of the pancreas. In chronic pancreatitis true diabetes is rare. It will be remembered that in cases of spontaneous hyperinsulinism not associated with an islet-cell tumour, surgical treatment to be successful involves the removal of about six-sevenths of the pancreas. It seems probable that chronic pancreatitis will not cause diabetes unless a similar proportion of islet tissue has been destroyed or rendered inactive by inflammatory changes, which of course happens rarely. The uncommon association of chronic pancreatitis with hyperinsulinism may possibly be explained by analogy with the known physiology of another gland having an internal and external secretion—the testis. Ligation of the vas and obstruction of the external secretion causes an increase in the internal secretion; and in the pancreas it is possible that chronic pancreatitis, particularly if confined to the region of the head, may cause obstruction to the external secretion while destroying little or no islet tissue. An increase in the internal secretion may result.

In acute pancreatitis, extensive destruction of the pancreas is far commoner, and the number of cases associated with diabetes is correspondingly greater. Even if true diabetes is not present, glycosuria occurs in about 11% of cases (Shumacker) and hyperglycæmia in a much higher percentage. Acute pancreatitis in the previously diabetic is almost invariably fatal, only one case with recovery being recorded. Should diabetes appear for the first time as a complication of acute pancreatitis, chances of recovery are small, in Shumacker's series only 6 surviving out of 25, and 2 of these dying soon after of diabetic coma. It is probable that the formidable combination of a major abdominal catastrophe and diabetes is made even more lethal than need be by failure to consider diabetes as a possible complication, and consequent failure to recognise the condition and institute treatment at the earliest possible moment.

It is clear that diabetes mellitus is, though uncommon, by no means a negligible complication of acute pancreatitis, and that minor temporary disturbances of carbohydrate metabolism, so far from being uncommon, are the rule. Acute pancreatitis is itself not common, yet 4 cases were treated on one surgical firm at the Middlesex Hospital within two months. Greater importance should be attached to estimations of blood-sugar as an aid to diagnosis in obscure cases in which pancreatitis is suspected, and in cases of proved acute pancreatitis routine blood-sugar estimations are advisable. When one of these unusual cases does come under treatment, such measures might make it possible for early treatment to save a life that would otherwise be lost.

I wish to thank Mr. R. Vaughan Hudson for his help and for permission to report this case; and Dr. R. W. Scarff, of the Bland-Sutton Institute of Pathology, and Prof. E. C. Dodds, of the Courtauld Institute of Biochemistry, for permission to refer to pathological and biochemical data.

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MASS RADIOGRAPHY

VOLUNTARY SCHEME IN A FACTORY

G. B. STANFORD, MRCS, ARPS

With supplementary notes on technical organisation by

K. C. CLARK, FSR

THE application of mass radiography to industry is in its infancy in this country. The technical side is well explored and satisfactory records are obtainable, but the problem of the organisation of a scheme in a factory, although of equal importance, has not been much discussed. In this paper will be presented a brief report on the results obtained from 600 people employed by a radio company, with special reference to the way in which the workers received the scheme.

THE ROUTINE

At the start a memo describing tuberculosis, its effect on production and the justification for using mass radiography as a means of early diagnosis was given to the management. Then, through the help of Sir Wilson Jameson, the prompt treatment of any early cases which might be detected was assured. The people to be X rayed were drawn from the scattered factories of a large company in North East London, and they all had to travel to the X-ray apparatus. The scheme was made possible by the kindness of Miss K. C. Clark of Messrs. Ilford, who put the equipment and facilities of her department at my disposal for as many people as I cared to bring. After a few teething troubles, the following organisation was adopted.

Names were collected by the factory nurses and were placed on a waiting-list, Note A being sent to every applicant. The X ray was taken every Thursday as soon after 5.30 as possible, so Notes B and C were sent out each Friday morning—that is,

NOTE A.—WELFARE DEPARTMENT

Your application for X ray has been received and I have placed your name on the waiting list.

At present X rays are done every Thursday evening, and you will be given a week's notice of your appointment.

FACTORY MEDICAL OFFICER.

just one week ahead. At 5.30 on the Thursday they assembled as directed and were escorted down by bus to the premises of Messrs. Ilford at BMA House. It should be noted that the workers came in their own spare time and at their own expense. They were encouraged to bring, and in many cases did bring, their mothers, brothers, sisters, sweethearts and children, but the scheme did not include friends, the idea being that immediate family contacts should be incorporated.

NOTE B.—WELFARE DEPARTMENT

Arrangements have been made for you to be X rayed on Thursday.

Sister Smith will meet you in the entry hall at 5.30 in the afternoon to take you to Tavistock Square.

Please bring this notice to the attention of your foreman or departmental head.

If for any reason you are unable to be present on this day, please let me know immediately so that I may make arrangements for someone else to take your place and give you another appointment.

FACTORY MEDICAL OFFICER.

On arrival at the premises the workers filled in a card (Note D) which, besides providing the means of identification in the apparatus, was used as a record, the X-ray report being written on the back later. The men and women were then separated and the men taken to the X-ray room, where they stripped to the waist and were quickly radiographed. While this was being done the women undressed to the waist and put on pyjama jackets. The men were then sent to dress in another room and the women brought into the X-ray room.

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This procedure worked quite smoothly, and 30 people, even under the relatively uncontrolled conditions, were done in the space of ¾ hour. At the beginning height, weight and chest expansion were also taken, but this was found to slow up

NOTE C.—FACTORY MEDICAL OFFICER

I shall / I shall not be present on Thursday, ...
for my X-ray appointment.

Signature .....

procedure too much and was discontinued. With suitably designed changing accommodation and restriction to one sex per night, the rate of work could have been materially increased, but speed was not attempted.

The miniature radiograms were interpreted by experienced radiologists, and I am indebted to Dr. H. Courtney-Gage and Dr. K. Poulsson for helping me in this way. As soon as the results were known they were entered on the backs of the cards which the workers had filled in, and were sent back to me by post. Form E was sent out in a sealed envelope immediately, so that usually each person knew the result within a week of the X ray being taken. A large gap was left between the text and the signature so that special comments could be inserted—usually to the effect that there was evidence of some trouble having occurred at some time which was of no significance to the worker's present health.

NOTE D

No. allocated.....Date.....
Surname .....
Initials.....Age .....
(The above particulars in Block Letters)
Shop
Clock Number

Weight
Height
Expansion
mAs Time O

NOTE E.—WELFARE DEPT.

With reference to your X-ray taken on , I am pleased to be able to tell you that the Indirect Radiograph shows no evidence of any abnormality in your chest.

FACTORY M.O.

Height in shoes, ft. in.
Weight, partially dressed, lbs.

By this method a point was made of informing the worker of any abnormality however slight so that, if it were rediscovered later on, the miniature radiographic technique adopted could not be blamed for having missed it. Any miniature radiogram suggesting abnormality was retaken on full-sized film before a diagnosis was attempted and, so that people should not think that their being recalled for this purpose necessarily meant that they had tuberculosis, I made a point of recalling at least two people from every weekly group.

If the finding was considered to have any bearing on his present health the worker was invited to see me, an invitation which was in every case accepted. I then explained the significance of the finding, and offered alternative courses to be adopted to deal with the problem, leaving it to his judgment to take the action he thought correct. He usually then asked what I would do in such a position, and acted on the course suggested.

A note of the X ray and the report was in every case attached to the patient's case-record card kept by my department.

THE FINDINGS

Condition	Known	Unknown
Structural abnormality	1	6
Old chest trouble other than tuberculosis ..	1	9
Presumed old tuberculosis healed of no significance	0	8
Healed, requiring observation	6	6
Active tuberculosis	0	2

("Known" here signifies that the condition was known to the worker before X-ray examination.)

One early case detected was confirmed by his tuberculosis officer and recommended for sanatorium treatment. Our medical department visitor followed up the case and obtained his admittance within three days. Another case detected was not confirmed by his tuberculosis officer and he is still at work under supervision.

Twelve cases of quiescent tuberculosis were thought to require supervision and are X rayed at six-monthly intervals in order to detect any early evidence of reactivation.

Nine healed tuberculous lesions, not requiring supervision, were discovered and nine other cases show evidence of non-tuberculous disease. Two abnormal hearts and a symptomless cervical rib are included among eight structural abnormalities discovered.

* * *

The number of cases found agrees tolerably well with the findings of other investigators, considering the small total involved. The sex-incidence of those attending is interesting, for in this company there is a preponderance of women. The excess of men's attendance is due to two reasons: First, intensive recruiting was done in two large shops, which supplied 25% of the total attendances, and it happened that in these two shops the men predominated; secondly, the women were afraid that they might have to strip in public. Later on, when this was pointed out to me, I took care to publish the fact that the women were given pyjama jackets to wear, and after that they arrived in larger numbers.

The numbers and age-distribution of those attending are shown on the graph, and this reveals an interesting disparity in age-incidence amongst the younger workers; the boys coming in steady numbers from the age of sixteen, whereas the girls show a gradually increasing attendance until they reach a steady level at the age of twenty. This I attribute to the fact that the boys are taught from an early age that as soon as they start work they are independent, whereas the girls learn that they must ask mother's advice until they are married. I repeatedly heard that, although the girls were willing to come, the mother had advised against it. Later on I advised the girls to make up their own minds and not to ask mother. This finding is of importance, for it is among just this sex and age-group—namely, girls between 14 and 22—that the incidence of tuberculosis is causing concern. Any outside propaganda addressed to the girls will also have to be addressed to their mothers.

The total number of suspect cases is probably swollen by the attendance of people who have had tuberculosis and have been discharged as cured from sanatoria and by people whose relatives have suffered or are suffering from the disease. The scheme served a useful purpose in that those who feared tuberculosis for one of these reasons but did not wish to draw attention to the fact were able, by attendance at the clinic, to set their fear at rest without going through the (to them) terrible formality of a tuberculosis dispensary, or receiving the unsatisfactory reassurance of a probably hurried examination by their overworked panel doctor.

THE WORKERS' VIEWPOINT

The attitude of the worker to tuberculosis needs to be clearly understood. He is inclined to hold the medical profession in profound suspicion, and this suspicion is even more keenly aroused if an attempt is made to look after him by a method of which he has had no previous experience, direct or indirect. Tuberculosis is to him an inevitably fatal disease, with which he associates loss of work for the long period during which he is dying, whereas observation of his afflicted colleagues tends to show that he could very well have remained at work for another month or two at least. Any attempt therefore to get him to take early preventive measures is handicapped. When recruiting, I often heard: "If I have tuberculosis, I would rather not know about it." This attitude is based on a deep-rooted fear, for the worker realises that if he has tuberculosis and does not know about it he can keep on at work until he drops dead, and then the care of his wife and family will fall on the state and he need not worry about them, whereas if he goes into a sanatorium he lies in bed worrying about his financial commitments.

In addition to these financial worries, the worker looks on tuberculosis as an "unclean" disease, like leprosy or venereal disease, and the accusation of tuberculosis is used as a veiled insult as is that of VD.

A male worker aged 24 from a mixed shop was suspected by his colleagues, on account of his sallow complexion and a rumour of sanatorium attendance, to be tuberculous. This was repeatedly and with innuendo suggested to him, with the corollary added that that being so he was not wanted in his community. After some months he broke down under this continued suggestion; he lost weight, slept badly, lost his appetite and became temperamentally nervous. Finally, he began to doubt whether his colleagues were not correct, and came to see me. Examination and X ray revealed no trace of organic disease, and he returned to his job. Inquiry

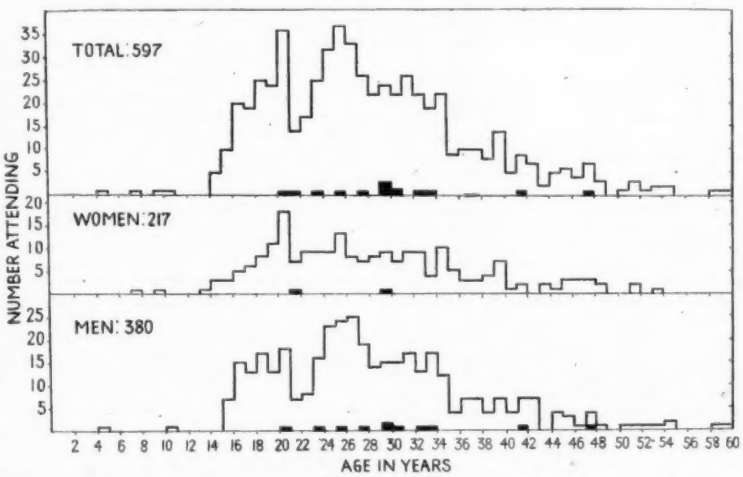
revealed that feeling had been running very high against him, and that the story had originated from a female co-worker who had had an empyema in the past and considered herself unduly susceptible to tuberculosis.

If a man is shown to be tuberculous, he is afraid his colleagues will shun him, and the works doctor must not be seen too often in conversation with a worker suspected by his colleagues.

The financial aspect should be carefully investigated before any large-scale scheme of mass radiography is contemplated. For the success of the scheme full wages should be paid to the worker while he is receiving treatment—that is to say, he should not have his financial commitments in any way affected as a result of taking early sanatorium treatment. To make this possible I suggest the use of a club system whereby everyone who is X rayed subscribes weekly to an insurance fund from which he can receive benefit if he is found to be suffering from tuberculosis.

With his possible financial embarrassment provided for, the worker's next doubt is whether the whole scheme may not be a hoax or a trick for getting him out of the company. A guarantee must therefore be given that, if the radiogram reveals that he is tuberculous, he will not be dismissed permanently, but will be taken back into employment on his return from treatment. It is essential that there should be no reservation in this assurance.

The workers should be told just what is going to happen—namely, that they are going to be surveyed for tuberculosis. Any subterfuge about pictures for the good of their health, or helping in an experimental survey for the good of mankind, is inadvisable (although, if it is pointed out that their coöperation is required for an admitted mass research, they will collaborate willingly just the same, as I proved for myself on another occasion). It is fatal to put forward half truths, since the worker checks up on every statement made to him, and if he can find a doubtful point he will suspect the whole scheme. This applies to any new plan, whether it be about health or wage payment.



Recruitment for the scheme was at first difficult, and had to be done by direct personal approach. This was better received in the shops known to be working under industrial hazard, such as the paint-spraying and metal-plating departments, which are conscious of the dangers to health that their occupation entails. Once a few people from a shop had attended, others followed; also all new employees examined by me were sent for X ray. Later on, when the existence of the scheme was more widely known, notices were posted in the shops, and names quickly obtained.

Sometimes I gave a talk to an entire shop, but this needs to be done carefully. One shop of thirty women whom I approached in the early days became alarmed and as a result of the talk refused to work any longer in a shop where they were exposed to enhanced risk of tuberculosis. For, if this were not so, why had I bothered to talk to them? Such a reaction may well occur when the average mental level of the shop is low and there is no dilution with more mature and balanced workers, from whom the others may obtain reassurance.

THE MEDICAL VIEWPOINT

The results must of course be confidential between the doctor and the worker, not conveyed to a third person without the patient's permission. Permission having been obtained, there can be no objection to notifying the welfare department so that contact with him is not lost. This course was adopted and no worker was forced to adopt any treatment he did not wish to undergo. The strictly professional basis ensures that there shall be no victimisation of any tuberculous person by his employer, and it is this danger which is holding back the trade-unions from ready acceptance of any comprehensive scheme.

It is important to inform the worker of the result of the X ray quickly, and so set his mind at rest. A swift report of the result was found to bring in further recruits immediately, whereas delay was apt to kill further response from that shop. Any small abnormality discovered should be mentioned in clear medical language so that the worker can, if he wishes, obtain a second medical opinion on the information supplied. Delayed reporting or obscure allusions are more detrimental to the worker's peace of mind and to the success of the scheme than is a true statement of fact made promptly.

Two other small points are worthy of note: the girls and the men should be X rayed on different days or in different groups; and the girls should be reassured that menstruation is no bar to examination.

Supplementary Notes *by* MISS CLARK

During a period when volunteers were required to submit themselves for X-ray examination in order to test the efficiency of miniature radiography, Dr. Stanford suggested the inclusion of factory workers, and this offer was welcomed in view of the experience to be gained from a type of subject entirely different from those hitherto encountered in this work. The first problem was that the workers had to come not only at their own expense but in their own time, and therefore after the normal working hours of my department, which meant that two people stayed voluntarily for an hour or more after a heavy day's work. During the winter months this routine was further complicated by the blackout.

BOOKING ROUTINE

It was noticeable that, in spite of the simplicity of the record card provided, help had frequently to be given to the workers in its interpretation. It was also found to be surprisingly difficult to get a group of people to line up in numerical order even when they were provided with numbered cards. This is important as the indirect radiograms are taken in numbered sequence in order to avoid confusion when the completed strip is projected for reporting. Such confusion is of course avoided when the record card is incorporated photographically on the miniature radiogram.

All the records were made in the first instance on these cards and copied the next morning into the departmental record books in order to avoid delay at the time of examination. Data were recorded as to height, weight and chest thickness at the level of the axilla, both on inspiration and expiration, and then these figures were correlated with exposure technique, but after experience had been gained from 2000 subjects, of which this factory group formed a part, it was decided that an expert radiographer who was doing this work continuously could judge adequately the exposure required for each

individual by simple observation of the development and chest expansion of each one, and it was therefore decided to discontinue these measurements.

It was noticed that the physique of these factory workers was in general inferior to that of a previous group of outdoor workers. There was a tendency to underexpose the earlier groups, especially the women, who were mainly of very slight physique, but when short exposures were given the breast tissues were not penetrated. However, sufficient experience was soon gained to allow of a satisfactory adjustment of exposure.

REACTION OF THE WORKERS

The men showed considerable interest in the X-ray apparatus and were amenable in every way, particularly when they found that the examination occupied so little time. On one occasion they were asked to submit to a second series of exposures on a trial X-ray unit, and there was no hesitation in doing so, indeed, there was genuine coöperation throughout.

The girls needed more discreet handling. It is clear that they would not have submitted to appearing without a chest covering, and they were provided with pyjama coats. In a number of cases the diaphragm was obscured by corsets and a little tact was sometimes needed to encourage their removal; otherwise, on reaching the exposure stand the corsets were rolled down sufficiently low to miss overshadowing the lung fields, and only in one or two instances was such overshadowing, with compression, noticeable in the radiographic results. A few really outsize subjects were encountered, and on these occasions three varied exposures were made to ensure obtaining sufficient density on at least one of the films. Occasionally a full-sized radiogram was taken during this first visit to ensure obtaining a diagnostic result; actually the miniatures proved to be quite satisfactory.

With children three exposures were made ranging from 10 to 30 mA sec. and generally these were all within the range of diagnostic requirements, due to the great latitude of the film employed (HPx). The children presented no difficulty except in the case of a point-blank refusal which we were forced to accept: a boy whose two small sisters were quite docile. Wives not employed by the firm were usually rather shy about the whole procedure, but it was often possible to examine the "family" separately, either before or after the main group of workers.

The films were developed the following morning, and the radiologist reported on the dried miniature by projection during the afternoon. The reports were immediately transferred to the cards which were posted direct to Dr. Stanford, reaching him within 36 hours of the time the examination was made. The trained staff employed consisted of a senior and junior radiographer. The booking and marshalling was undertaken by volunteers among the factory workers.

It is of interest to note that in one instance a processing fault (drying marks known as tear-drops) led to an error in diagnosis (being interpreted as metastases), but the routine direct radiogram taken later enabled the error to be corrected. This case served to bring to notice the possibility of such errors being made due to technical defects; but it should be noted that of this particular defect only one instance has occurred in 5500 exposures.

TECHNICAL FACTORS

Both miniature and full-sized radiograms were taken on a standard four-valve unit with fine focus rotating anode tube. The camera unit for the miniature work is fitted with a "Contax" camera having a 5 cm.f. 1·5 "Sonnar" lens; Levy-West yellow-green fluorescent screen with standard lead glass protection; and a stationary radiographic grid.

The miniature radiograms were taken under the following conditions; 85 kV peak, 35 to 45 mA sec., and 36 in. anode-screen distance; employing Ilford HPx film developed for 8 min. in "Blue Label" developer. The full-sized radiograms were taken at 57 to 67 kV peak, 20 mA sec. and 66 in. anode-film distance.

Viewing of the miniature radiograms was by projection to a size of ca. 6 in. square; interpretation was by the two radiologists independently.

MINIATURE SCARLET FEVER AFTER A DICK TEST

HUGH R. E. WALLIS, M B
FLIGHT-LIEUTENANT, RAFVR

MINIATURE scarlet fever has been described after the injection of immunising doses of scarlatinal toxin. Five hundred times the skin-test dose is the lowest amount recorded to have caused this reaction. The symptoms described are scarlatinal rash and desquamation, malaise, headache, vomiting, diarrhœa, pyrexia up to 101° F., and in children urticaria and joint pains.[1] There is no record of such reactions occurring after the test dose in a Dick test (0·2 c.cm. of a 1 in 1000 dilution of broth filtrate). The positive reactions to the Dick test are described by the Dicks[2] as showing "All gradations from small areas of faint colour to intensely red reactions 30–60 mm. in diameter."

A WAAF nursing orderly was in contact with a case of scarlet fever in March. She had not had scarlet fever herself. A Dick test was performed, and a finely punctate erythema which faded on pressure appeared on her forearm and neck and the opposite arm (which was not used as a control). She felt ill and was confined to bed for 5 days. She did not vomit and had no temperature throughout. The rash lasted for 10 days and then peeled in the characteristic ringed manner. A Schultz-Charlton test performed rather late was negative; a throat swab showed "Mildly hæmolytic streptococci." No similar reactions were seen among other orderlies and patients tested with the same batch of toxin, and at this stage it seemed possible that she might have had a mild attack of scarlet fever, but the spread of the rash from the site of injection was against this theory.

Three months later another Dick test was performed. This time the toxin was diluted 50 times, so that she had 0·004 c.cm. of the standard toxin. This was injected intradermally in the right forearm. The usual precaution of clearing the needle was taken. The next day a punctate rash appeared over the whole flexor aspect of the forearm, and a day later the same type of rash appeared at the base of the neck and on the other forearm. A control injection of 0·2 c.cm. of undiluted heated toxin in the leg produced an irregular area of reddening about 5 cm. in diameter which rapidly disappeared. A Schultz-Charlton test was performed on the right arm, and this showed local blanching. The patient's temperature was raised to 99° F., she vomited several times and had a headache. She was again in bed for 5 days. The temperature fell to normal in 2 days. The rash began to peel on the 6th day after injection.

This seems to be a clear case of miniature scarlet fever after a very small dose of scarlatinal toxin. It would be interesting to see the reaction of this patient if she contracted scarlet fever, or even if anyone attempted to immunise her with the usual doses of toxin.

I am indebted to Dr. Philip Evans, who searched the published work for me; and to the patient, who consented to undergo the second injection and make herself "a human guineapig," as she called it.

1. Dick, G. F. and G. H. Scarlet Fever, Chicago, 1938. Pp. 89, 90.
2. *Ibid*, p. 81.

EVACUATION OF MENTALLY DEFECTIVE CHILDREN.—The education authorities for London and Birmingham have some vacancies at their residential special schools in reception areas which they are willing to place at the disposal of other authorities who wish to evacuate mentally defective children.

CHARTERED SOCIETY OF MASSAGE AND MEDICAL GYMNASTICS.—The annual congress of this society will be held at BMA House, Tavistock Square, London, WC1, on Sept. 18 and 19. The opening lecture will be given at 2 PM by Prof. J. A. Ryle who will speak on the re-making of man. Afterwards Prof. F. R. Fraser will describe the place of rehabilitation in the treatment of patients, and at 6 PM Lord Horder, president of the society, will deliver the founders' lecture. His subject will be rehabilitation: the part played by physical medicine. At 10 AM on the second day of the meeting Surgeon Lieut.-Commander John Bunyan, LDS, will discuss the treatment of wounds and burns by the envelope method, and at 11.30 AM. Dr. Vaclav Benes will lecture on physical training organisation in Czechoslovakia. Further information may be had from the secretary of the society, Mount Lodge, Amersham, Bucks.

Reviews of Books

Doctor Bard of Hyde Park

J. BRETT LANGSTAFF. New York: E. P. Dutton. Pp. 365. $3.75.

IN the middle of the eighteenth century Dr. John Bard of New York resolved that his son who wished to adopt the medical profession should have the advantage, which had not been his, of education in a British medical school; and at some inconvenience to his purse he sent his son Samuel to study at the University of Edinburgh, which was at that time rising into great reputation. Sam Bard arrived in Great Britain in the year 1763, after having spent five months as a prisoner of war in France. He stayed some time in London attending the hospitals and forming connexions with the medical men and others to whom he had letters of introduction; and in the autumn of that year he entered on his degree course with an enthusiasm and assiduity which had their merited reward. He seems to have become during his residence there not merely an accomplished physician but popular and highly respected. His principal teachers were Cullen and the two Munros. After taking his degree, family ties took him back to New York in 1766, filled with ideas of creating a medical school in his native state. He entered into partnership with his father at the age of twenty-four, and had thirty-two years of practice interrupted by the War of Independence but on the whole so steadily prosperous that at the age of fifty-six he was able to retire from the city and live in a house which he had built at the estate of Hyde Park on the banks of the Hudson. His retirement was not complete for he often returned to the city to see old patients in consultation with his successor; and in the remaining twenty-three years of his life he was active in organising medical education, and in every scheme which promised medical, horticultural or religious advance. At his death there was hardly a sphere of progress which he had not touched. To the medical profession in this country his work is chiefly of interest because of the far-seeing wisdom he displayed in the organisation of the teaching of medicine; but to his own generation he was the embodiment of all the virtues which distinguish the beloved physician. Dr. Brett Langstaff in this account of the lives and times of the Bards, father and son (for John Bard was also a remarkable man) has written a captivating story. The one fault—easily remedied in another edition—is the absence of a map of the New York of the time. The reader continually hungers for it, and would welcome another of the environs, including the estate of Hyde Park.

Psychiatric Dictionary

LELAND E. HINSIE, MD, professor of psychiatry, College of Physicians and Surgeons, Columbia University, New York; JACOB SHATZKY, PhD, research librarian, New York State Psychiatric Institution. London: Humphrey Milford, Oxford University Press. Pp. 559. 55*s*.

IT is natural to stand in awe before the compilers of dictionaries and to wish them judged only by their peers, men who are acquainted with the immensity of the task; but here is a hybrid, half dictionary half encyclopædia, swollen with obsolete terms, psychopathological excursions and thumbnail sketches of syndromes: it is impossible to remain awe-stricken before it. In it, psycho-analytical bias is carried to the length of including as technical terms any descriptive phrase in the writings of Freud and other analysts; thus "wit, allusion in," "wit, critical," "wit, cynical," "wit, double meaning in," "wit, doubt in," and some further twenty odd varieties of wit, or references to it, all from one book of Freud, are listed as separate entries. The pronunciation is recorded of even the simplest words, like egg, first, food, form, dream, maid (defined only as "a virgin man, one who has not had sexual intercourse. Obsolete"); however with the exception of "ego" (indefensibly given with the "e" as in "negro") the pronunciation of terms is sound, differences between English and American usage being accepted. Proper names in the book are not always so happily dealt with: Clouston and Esquirol are mispronounced; MacDougall and Schilder are listed as Americans, yet Kronfeld still as a German; Henry Maudsley is omitted altogether (Mercier is included); Berze is misspelt Berz; and Jack the Ripper is said to have been an epileptic London physician, which will come as news to Londoners. The system of cross references leads to such unnecessary entries as "cat, belief one is a"; "origin, belief that one is of divine"; and surely no-one should be encouraged to find or use "galeanthropy" "uranomania" or other of the monstrous Greek compounds with which the book swarms. French terms are well represented but German ones less so: Gedankenlautwerden, Grübelsucht and Beziehungswahn are lacking. So also is mandala; latah is not mentioned, but miryachit (apparently a Siberian variant) is fully noticed. Anosognosia is omitted, as is also its German equivalent "Anton's sign." But the most serious defect in this comprehensive and well-produced thesaurus is its poor treatment of some of the commonest words in psychiatry, such as hysteria, neurosis, schizophrenia or dementia præcox. Here the book fails to provide, as it should, a standard which would give some stability to the meaning of terms still confusingly mutable though in constant use.

The Handling of Chromosomes

C. D. DARLINGTON, FRS, L. F. LA COUR. London: Allen and Unwin. Pp. 165. 8*s*. 6*d*.

ONE of the writers of this book has probably done more than any other living man to increase our knowledge of chromosomes, the other has made useful contributions to the technique of studying them. They have collaborated to the advantage of fellow cytologists in preparing this authoritative account of the smearing and squashing methods which are nowadays largely replacing the familiar section techniques. Some may object to the insistence on the employment of apochromatics for high-power object-glasses; and to call Feulgen's reagent "leuco-basic fuchsin" is a misleading oversimplification. The use made of the term "osmic acid" has actually misled the writers of the book into classifying as an acid a substance which forms no hydrogen ions, is a non-electrolyte, and only produces salts by a roundabout process. The photographic illustrations, which are not very helpful, might have been omitted, thus reducing the cost. Such defects, however, are trivial. The book is not intended for those who need to understand the physics and chemistry of what they are doing, but for the practical man who wants to make good preparations of chromosomes; and it is full of helpful direct information. The calendar showing in what organisms chromosomes may be studied each month of the year is novel and useful.

Handbook of Practical Bacteriology

(6th ed.) T. J. MACKIE, MD Glasg, DPH; J. E. MCCARTNEY, MD, DSc Edin. Edinburgh: E. and S. Livingstone. Pp. 675. 17*s*. 6*d*.

ALMOST a hundred pages of this edition are needed to set out the important advances in bacteriological technique and knowledge made in the last four years. New methods of diagnosing diphtheria and intestinal infections, the use of *p*-aminobenzoic acid in culture media and the bacteriological examination of the air are among the subjects now discussed. The revised section on virus diseases gives the new facts about lymphocytic choriomeningitis and influenza but relevant information about the common cold fits easily into a third of a page and infective mononucleosis is dismissed rather summarily in half a page. Some recent bacteriological work is accepted perhaps a little on trust and a note on the recognition of sulphanilamide-resistant strains of bacteria might have been added. The book fulfils its intention to serve students, technicians and routine bacteriologists. There is a good general introduction, technical methods are selected with care, instructions are to the point and the book is well produced and can still be comfortably held in one hand.

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Fortunately, adequate and exact doses can be given by mouth in small bulk; but where the vomiting is persistent 'Berin' may also be given by injection.

Vomiting is of course a common symptom requiring diverse methods of medical or surgical treatment, but doctors frequently find a special use for 'Berin,' particularly when the symptom occurs in fever, pregnancy, and chronic gastro-intestinal disease associated with hypochlorhydria.

Glaxo preparation of vitamin B_1 (aneurine hydrochloride B.P.). Available in 1 mg. and 3 mg. tablets for oral therapy; 1 cc. ampoules for injection, containing 5 mg. and 25 mg.

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THE LANCET

LONDON: SATURDAY, AUGUST 22, 1942

UTILITY FIRST-AID

THE long-established methods of first-aid taught by the St. John and St. Andrew Ambulance Associations and the British Red Cross remain fundamentally sound, but they have now to be adjusted to meet the conditions of aerial warfare. TRUETA laid down, at Barcelona, the principle that in a blitz casualties must be got to hospital as soon as possible and with the minimum of handling. To meet this new demand for simplicity and speed, methods of treatment and terminology have alike been modified. Booklets setting out the new point of view have been written by members of first-aid and stretcher parties experienced in raids. Lectures have been given to the WVS on immediate aid. COWELL has published a five-lecture course for the Home Guard on essential first-aid. At a recent course for Home Guard medical officers, H. A. HARRIS insisted that in the teaching of first-aid all frills and trimmings must be cut out in favour of bare essentials. A Home Guard battalion has issued its members with a folder the size of three luggage labels which details the minima of assistance, and provides a casualty label should the man be wounded. Another folder[1] designed by KEOGH sets out in a few words and pictures what every soldier must know about first aid. In each of the twelve Home Security regions of the country there is a regional training school, originally started for rescue parties, and later expanded to include first-aiders. Leaders of rescue, first-aid and stretcher parties now go for intensive training to these schools, so that they may return and pass on the information to their squads. Some of the schools are run by the local authorities; some are the responsibility of the regional administration.

Details vary in the different training centres, but the principles of the new utility first-aid are accepted in all. Thus all are taught that the man who first reaches a casualty should protect him as far as possible from any immediate source of danger such as moving machinery, electric cables or masonry which is threatening to fall. The first step in direct treatment is to stop bleeding by dry dressings and firm bandaging. Experience has shown that tourniquets are seldom required and it is a relief that the Samway tourniquet, first issued, has now been withdrawn. Most of the new writers agree that a tourniquet should only be used for an injury amputation. Even pressure points are given less prominence than they were. The next essential is to see that the air-passages are clear; rubble and dust must be removed from the mouth and artificial respiration given if necessary, especially if there is reason to suspect coal-gas poisoning. The methods suggested are Schafer's, Sylvester's, the rocking method and the direct method. Cleansing of wounds has to be omitted, because it is usually impossible at the site of the incident, and in any case wastes time. Splinting has been reduced to a minimum, which again saves time and lessens handling. Application of splints in the dark is a stiff ordeal even for a skilled first-aider and certainly for the patient. The patient's suffering—and therefore his shock—will be less if a broken arm is simply tied to the trunk with broad bandages, or if a fracture of the lower limb is treated by placing a rolled blanket between the legs and tying them together. The exception is a fracture of the patella, which should *always* be splinted. First-aid for burns now consists in covering them with a dry dressing and speeding the patient to hospital. Blanketing should be carefully taught—the Wanstead method is now universal—and first-aiders should be well drilled in lifting casualties gently on to stretchers and in loading and unloading ambulances. "Careless handling may lose life" is a good motto. The danger period is between the time of injury and rescue and of arrival at hospital; the good first-aider will be out to make this interval as short as possible.

When many casualties have to be dealt with at one incident the worst must have priority in first-aid and transport: thus the first-aider must be able to recognise both the nature of the injury and its gravity. The concept is new, and is not touched in any of the standard manuals, but it must be taught and well taught. Thus, while teaching must be intensely practical, there must be a clear understanding of underlying principles, particularly among leaders of parties, for they not only have the responsibility of training others but must themselves be capable of quick decision in the more difficult cases. Doctors must take full part in instruction, to make certain that the standard is kept at a safe and efficient level. This cannot be left entirely to lay instructors, however keen. Sense of proportion about cases and treatment can only be acquired through medical training and experience. Shock provides a good example of the difficulty: it is an exceptional candidate for a first-aid certificate who has an intelligent grasp of this condition, even from his own necessarily limited point of view. Everyone should know the essentials of what might be called immediate help. "First-aid" has its field and practice defined by usage, and it is to bring out the difference that such terms as "essential aid" and "blitz aid" have been used. The standard doctrines have not been upset, only modified; first principles remain unchanged and a sound grasp of them enables well-taught first-aiders to meet emergencies with that intelligence which rule-of-thumb methods can never confer.

1. See *Lancet*, 1941, ii, 313.

PROCAINE AND PERCAINE

IN the autumn of 1939 a patient died in Bournemouth because 'Percaine' solution was dispensed by a chemist when the doctor wanted procaine. Under "Medicine and the Law" this week there is an account of another fatality, in an Oxfordshire hospital. Here, according to a newspaper report of the inquest, the highly experienced hospital dispenser sent percaine crystals to the operating theatre instead of procaine, thinking they were similar substances. The surgeon thus came to inject 1·25 grammes of percaine in 5% solution, some ten times the maximum dose, though safe enough if the solution had been procaine. A correspondent treating a case of fibrositis was lately told by a consultant that "an injection of percaine or novocain into that area once or twice a week would be helpful." Thinking that these were

both proprietary names for procaine, which has many,[1] she ordered a 1% solution. Fortunately, after the injection of 6 c.cm. the patient's reaction suggested that something was wrong and no more was given, so that the patient escaped with nothing worse than a few hours of collapse. These examples show that the names percaine and procaine are sufficiently alike to lead to confusion, and though recent correspondence in our columns suggests that the safe dose of percaine has yet to be decided it is roughly a tenth that of procaine. Two years ago [2] we expressed the hope that the manufacturers of percaine would sell their product here under the name by which it is known in the United States—'Nupercaine.' The makers retorted,[3] with some justice, that the trade mark 'Percaine' was registered in 1918, whereas procaine was not adopted by the BP until 1932, so that it was for the BP to make a change if one was necessary. The BP name was no doubt adopted because it was already official in the United States Pharmacopœia, and the BP and USP try to conform in nomenclature as closely as possible. The position was considered a year ago by the BP Commission, but it was not then thought possible to take any action. The makers, too, are naturally loath to incur the great expense and inconvenience of discarding a trade name which is used throughout Europe and the British Empire and in nine-tenths of the published work on this compound. If further accidents are to be avoided either BP Commission or manufacturer must go to much trouble and expense, but the danger is serious, and a friendly discussion between the two would surely evolve a solution.

WAR AND THE NERVES

THE incidence of neurosis in the civilian population is one of the many respects in which the war has falsified prediction. Before its outbreak enormous civilian casualties were prepared for; it was expected that our cities would, like Rotterdam, be overwhelmed with devastating air-raids which would kill many, injure more and drive still more into acute neurotic illness. When the air-raids came, they caused fewer casualties than corresponding material damage, and their effect in the causation of neurosis has been, as Dr. LEWIS pointed out in our last issue, almost negligible. If what has been written on neurosis in the Forces is compared with LEWIS'S findings in civilian life considerable light is thrown on ætiology. In both types of population the importance of predisposition has been revealed. There had been previous neurotic illness in three-quarters of the neurotic patients presenting themselves to a general practitioner during the worst period of air-raids London has known. In as high a proportion the air-raids played a part in exacerbating the illness. But while only a quarter of the neurotically predisposed made great improvement or recovered, 70% of the others did. It is clear that evacuation has been a powerful method of prophylaxis against air-raid neurosis. Most of those who have wished to do so have been able to take advantage of Government schemes for evacuation, and the population that has stayed behind in the danger points has been self-selected for stability. This is one of the main ways in which the stresses imposed on Service personnel have differed from those inflicted on the civilian. The soldier is posted to this or that point regardless of his inclinations, and when he finds things proving too much for him, it is not open to him to get out of it. Many of the neurotic pictures shown by the soldier have taken the form of attempts in that direction—absence without leave, amnesic and fugue states, and desertion.

The stresses of war are manifold; and if fear has not been very prominent as a cause of illness, that is not so with long-continued worry and other hardships such as the dislocation of family life. The break up of the home has been a feature common to military and civilian life: but whereas for the civilian it has been, partly at least, voluntary, for the soldier it has been compulsory, and even families where mutual dependance is strongest have been unable to resist separation. It is not surprising that many of the men who were fairly adjusted to civilian life but broke down rapidly after enlistment are more than usually dependent on their wives and emotionally tied to their families. The same stress when voluntarily or when compulsorily submitted to may have a very different degree of rigour. Physical factors have not been very important in the production of neurosis. The management of our food-supplies has been one of the outstanding successes of war-time administration, and defects of nutrition have in general played a minor rôle. In the hyperacute anxiety states physical factors have played a larger part. Long-continued physical exertion, inadequate food and sleep were largely responsible for the more severe neurotic states seen after Dunkirk, and are associated with exposure and psychogenic stimuli in similar syndromes seen sometimes in shipwrecked seamen. These states have been remarkable for their rarity in civilian life—at least in this country in this war, though MIRA has reported their frequency in the Spanish civil war. LEWIS refers to formes frustes of this manifestation. For a few days after severe bombing, especially with several sleepless nights, a state of acute but temporary anxiety may develop which passes off with rest and proper care. The preference shown by the public for deep rather than surface shelters probably depends on the relief from the noise of an air-raid and its associated feeling of tension, the near-certainty of safety, and the possibility of refreshing sleep.

Both age and youth have provided their special problems, although air-raids seem to have little specific effect on the old and the young. The break-up and confusion of family life have made the care of those who need it more than normally difficult. Institutions have received larger numbers of people enfeebled by age and arteriosclerosis, and in the adolescent there has been a considerable rise in the frequency of juvenile delinquency. The contention that our society is built on a basis of stable family life receives confirmation here, and factors that have a disruptive effect on the one cannot leave the other unaffected. The importance of this for neurosis lies in its relation to communal morale. In the army regimental traditions and company life, and in the navy the ship's company, make for the soldier or sailor a new family unit, and the extent to which he can be reintegrated and his emotional needs satisfied in this way will largely

1. The Extra Pharmacopœia gives Allocaine, Syncaine, Æthocaine, Kerocain, Neocaine, Novocain, Planocaine and Sevicaine.
2. *Lancet*, 1939, ii, 944.
3. *Ibid*, p. 1097.

determine his stability, his happiness and his usefulness. The proximity of death, hardship and the ubiquity of destructive forces give existence a new meaning. In this war, as in earlier ones, there is a significant fall in the frequency of suicide. New aims for which to live, work that satisfies higher as well as more immediate needs, a tightening of the bonds which draw our community together and unite it with the rest of humanity, provide an inspiration which does much to offset the circumstances that lead to discouragement and neurosis.

MEASURING SULPHONAMIDE ACTIVITY

THE dosage of chemotherapeutic agents depends on a large number of factors, many of which relate to the host. Even their in-vitro action, however, varies greatly under different conditions, and not long ago it was counted an achievement to demonstrate any in-vitro activity in many agents of proved therapeutic value. With sulphonamides, the factors governing in-vitro activity have now been largely disentangled. The effects of different media have been allocated to definite antagonistic substances, of which *p*-aminobenzoate is the principal one. These are now recognised not as extraneous factors sent to plague the chemotherapist but as fundamental to the action of the drugs. The sulphonamides are bacteriostatic because they are sufficiently similar in structure to *p*-aminobenzoate to oust it from the essential bacterial enzymes which use it. This functional relationship to *p*-aminobenzoate has now been used to give numerical values to the activities of the different sulphonamides. The ratio S/P, where S represents the concentration of a sulphonamide necessary for bacteriostasis in the presence of different concentrations P of *p*-aminobenzoate, is almost constant for a given sulphonamide and a given organism, and is a measure of the purely antibacterial action of the drug. The smaller this ratio—that is, the smaller the quantity of drug needed for bacteriostasis—the more affinity does the drug have for the system it is disturbing. Such ratios have now been determined for various organisms and drugs; they have been referred to as antibacterial indices,[1] or as measuring bacteriostatic potency,[2] and their reciprocals have been called bacteriostatic constants.[3] They are formally related to Ehrlich's chemotherapeutic index, though the connexion is by computation and not yet by experiment.[1]

The results of WYSS and others,[4] given in the table, indicate that to both sulphanilamide (the least active drug) and sulphathiazole (the most active) the susceptibilities of seven organisms were in practically the same order; the ratio between the indices for the two drugs was much the same with each organism. Thus, as GREEN and PARKIN point out on our opening page, it is a fallacy to think that a particular sulphonamide is specific for a particular organism: the most active drug against one organism is normally the most active against all. All workers agree in principle with these results but give different numerical values for the antibacterial indices, almost certainly because they adopt different conditions of growth and different criteria of bacteriostasis. Thus WYSS and his colleagues observed the quantity of drug necessary to reduce bacterial growth in 16 hours to half its normal amount. WOOD[3] judged by the absence of visible growth during 5 days and therefore placed

	DECREASING ACTIVITY → Sulpha-thiazole	Sulpha-diazine	Sulpha-pyridine	Sulph-acetamide	Sulpha-guanidine	Sulph-anilamide
DECREASING SUSCEPTIBILITY ↓ *Bact. coli*	27 (36)	43 (100)	450 (100)	534	3960 (1000)	2000 (1610)
Bact. aerogenes ..	45	..	..	..	..	3220
Proteus vulgaris ..	55	..	..	..	..	4000
Staph. aureus ..	53	92	416	534	4570	4660
S. typhimurium ..	92	..	..	..	..	6650
B. acidophilus ..	133	..	..	..	..	8000
Ps. pyocyanea ..	184	..	..	..	..	13330

ANTIBACTERIAL INDICES OF SULPHONAMIDES

Compiled from Wyss et al.[4] and Wood.[3] Wood's values are in parentheses. The figures for different organisms are in the main comparable, but not entirely so because conditions of growth were not inform.

sulphadiazine equal in activity to sulphapyridine, while ROSE and FOX[2] agree with WYSS in putting the activity of sulphadiazine equal to that of sulphathiazole. Of the conditions of growth which affect the indices, SCHMELKES and others[5] have shown pH to be of fundamental importance, and have demonstrated that the increase in potency of all sulphonamides with increase in pH is in accord with other evidence that the actual functioning part of a sulphonamide is an anion. In solutions of different sulphonamides whose strength is adjusted to give equal activity, the concentrations of anions are of the same order of magnitude.[6] It is apparently the group $-S\begin{matrix}=O\\ NH_2\\ -O^-\end{matrix}$ which simulates $-C\begin{matrix}=O\\ -O^-\end{matrix}$ at the drug receptor. Thus differences between the antibacterial indices of the sulphonamides for a given organism largely depend on the amount of anion in their solutions.

In the clinical use of sulphonamides many more factors—differences in solubility, in absorption, detoxication and excretion by the host and even in availability and cost—must be taken into account in choosing the drug best suited to a particular purpose. For instance, we choose sulphaguanidine to attack intestinal organisms although its in-vitro activity is low. On the other hand, in the choice of sulphathiazole for staphylococcal and mixed infections antibacterial index is the overriding consideration. Thus although studies in vitro cannot include all the factors which have to be considered in practical chemotherapy, yet with the present use of defined media they are giving us fairly accurate information of great practical value. Animal experiment, it must be remembered, introduces new and unknown factors to the study of human infections.

1. McIlwain, H. *Brit. J. exp. Path.* 1942, **23**, 95.
2. Rose, H. M. and Fox, C. L. jun. *Science*, 1942, **95**, 412.
3. Wood, W. B. jun. *J. exp. Med.* 1942, **75**, 369.
4. Wyss, O., Grunbaugh, K. K. and Schmelkes, F. C. *Proc. Soc. exp. Biol., N.Y.* 1942, **49**, 618.
5. Schmelkes, F. C., Wyss, O., Marks, H. C., Ludwig, B. J. and Strandskov, F. B. *Proc. Soc. exp. Biol., N.Y.* 1942, **50**, 145.
6. Fox, C. L. jun. and Rose, H. M. *Ibid*, 1942, **50**, 142.

Annotations

BOOKS FOR POLAND

INTELLECTUAL life in Poland is being systematically suppressed. When the time comes, it will be restored equally systematically, and that is a task in which our country hopes to share. Books can be replaced, and the Poles will themselves revive their nation's learning: anyone who has read Eve Curie's life of her mother knows that. We can at least help to put back the books. At St. Andrews University, which has specially close links with Polish officials and students, a committee has been formed to invite promises of books to be made available after the war. The committee, which includes Sir James Irvine, principal of the university, asks the help of British universities, learned societies and libraries in providing surplus sets, or parts of sets, of transactions or proceedings, standard works, textbooks, journals and periodicals in every department of learning. Individual scholars may be able to promise books from their own shelves, memorial collections or sets of English classics, or subscriptions for the purchase of books. No attempt will be made to accumulate books at present; but a catalogue of books promised will be compiled and handed to the Polish government, which will be responsible for their transport from the donors to Poland when the time comes. Those who will help should write to Mr. N. S. Snodgrass, secretary to the Polish Libraries Committee, The University, St. Andrews, Dundee.

A RARE BONE DISEASE

MELORHEOSTOSIS was first described by Leri and Joanny in France in 1922; Franklin and Matheson[1] give details of a recent case discovered in this country. Leri described the condition as "a flowing hyperostosis of a single extremity," and reported two cases. Since then about 40 cases have been recorded, but few in Great Britain. In 1932 Kraft reviewed 16 reported cases—5 in Italy, 4 in Germany, 3 in America, 2 in France, 1 in Poland and 1 in Sweden. The hyperostosis usually but not necessarily chiefly affects the bones of one limb and its girdle, and is confined to one aspect (lateral or medial) of the affected bones. As a rule the skeletal changes are confined to one side of the body. The X-ray appearance of the new bone is like the wax running down the side of a candle. There are no characteristic physical signs though the patient often complains of pain or disability due to the bone thickening.

The main trouble of the woman of 41, described by Franklin and Matheson, was the great size and weight of her right leg, associated with varicose veins, œdema and recurrent ulceration of the dorsum of the foot. The bone condition was first noted in her eleventh year, when her left leg was found to be shorter than her right; since that time she had worn a built-up surgical boot on the left foot, to adjust the difference between the two limbs. Typical changes were present in many of the bones of the right side of the body, including the skull, several vertebræ, two ribs, the humerus and ulna, several carpals, metacarpals and phalanges, the pelvis, femur, patella, tibia, fibula, all the tarsals and several metatarsals and phalanges. The large number of bones implicated is unusual. The diagnosis of these cases is radiological, the appearance of thickening down one aspect of the bones being due to ivory-like proliferation of cortical bone. The sclerosis seems to begin inside the bone, and the marrow cavity may be obliterated. There may also be deposits of bone in the soft tissues round the joints. Specimens of such deposits or of affected bone obtained by biopsy have been examined, and the appearances vary with the stage at which the specimen is removed, sometimes showing active osteoblasts and normal haversian systems, and sometimes irregular ossification and the formation of dense bone. There is no completely satisfactory explanation; hypotheses have ranged from disturbance of the vasomotor mechanism of the nutrient artery to infection, endocrine disturbance, developmental defect and subperiosteal telangiectasis. Malignancy, tuberculosis and syphilis seem to play no part in any of the recorded cases. No fractures have been reported. Treatment has been symptomatic and X-ray therapy has been tried without success; surgical treatment does not seem to have been tried in any case and no autopsy findings are available. Many of the cases have been found in childhood, or are thought to have started in childhood, being discovered later during routine examination; and increasing numbers of cases are now being recognised. It is possible that a few cases may be discovered in recruits for the Services.

1. Franklin, E. L. and Matheson, I. *Brit. J. Radiol.* 1942, **15**, 185.

RESEARCH IN IRELAND

THE Medical Research Council of Ireland are somewhat hampered by lack of funds, but nevertheless have used their income of £5000 a year to provide their usual training grants, whole-time and part-time grants for research, and grants-in-aid. In conjunction with Prof. E. J. Conway, Mr. P. J. Boyle, M.Sc., has investigated potassium and electrolyte equilibria in muscle and in the isolated kidney; he has demonstrated that the proximal kidney tubule shows the permeabilities characteristic of muscle. He has also studied potassium equilibria in the yeast cell by a method depending on the displacement of the potassium by ammonium ion, and the same principle has been used by Mr. John Breen, Ph.D., to investigate possible changes in the potassium concentration in yeast. Mr. T. G. Brady, Ph.D., has prepared adenine deaminase in high concentration from calf's intestine. An inquiry of immediate practical interest is that of Dr. Einhart Kawerau into the concentration of ascorbic acid in natural foods in Ireland. Dr. James Deeny and Mr. G. L. Murdock, B.Sc., are studying the interrelation between immunity, infection and vitamin-C concentration, and are also researching on polycythæmia. The serological studies of Prof. Hans Sachs have a topical application to methods of transfusion; and a reliable technique for blood-grouping with higher concentrated sodium-chloride solution has been recommended for general typing. He has also investigated peculiar blood samples, irregular iso-agglutinins and polyagglutinability, all of which have a bearing on the reactions which may follow homologous transfusions. Systematic examination of the pelvis has been made in a series of cases by Dr. S. J. Boland with a view to forecasting difficulties in childbirth. Dr. T. E. T. Bradshaw has been studying the excretion of œstrogens and related substances in adrenal disorders. Dr. J. D. H. Widdess is investigating the pathology of the hypothalamus in disease. The pathologists have been particularly lively, Prof. J. F. Donegan being engaged in research into the action of adrenaline on the frog's heart in relation to the production of energy and the storage of potassium. Dr. Oliver FitzGerald has studied problems associated with the presence of ammonia in the gastric juice, and with the diffusion of inulin through various tissues. Mr. M. G. A. Little, F.R.C.S.E., has been studying the effect of antonomic reflexes on the blood-pressure in the spinal animal, and Dr. D. K. O'Donovan has gone on with his investigation of the metabolism of hypophysectomised frogs. Studies of the hyperventilation syndrome have been completed, and a new sign for the discovery of latent tetany has been described, based on the response to hyperventilation. In the fields of public health and bacteriology, Prof. J. W. Bigger and Mr. J. Havelock Nelson have found that talc, and some twenty other inorganic substances, make distilled water capable of supporting bacterial life. Miss Ethelwyn M. Mason, Ph.D., and her colleagues have continued to estimate the prevalence of goitre in Tipperary. Prof. R. A. Q.

O'Meara has made a further study of diphtheria antitoxin during the year. Other work supported by the council has been a study of the function of the acrosome in mammalian fertilisation by Prof. J. Brontë Gatenby, research by Dr. J. G. Waugh into the microscopic and other changes produced by the action of sulphonamides and other drugs on eggs, and the investigation of a case of adrenal cortical hyperplasia by Dr. L. K. Malley. Some twenty papers have been published in scientific journals during the year. The aid of the council has also been sought by the advisory committee on diarrhœa and enteritis established by the Minister for Local Government and Public Health. These conditions have been made compulsorily notifiable since the outbreak reached its peak, in the summer of last year. Dr. J. St. L. O'Dea, working under the Dublin medical officer of health, will study the clinical and sanitary aspects, and Dr. S. Sevitt will conduct a bacteriological inquiry into the cause of the condition at the school of pathology of Trinity College, working under Professor O'Meara.

CAUSE OF DEATH IN ANURIA

SUPPRESSION of urine is one of the most harrowing and mystifying things a physician may be called on to treat. He knows that unless the flow of urine can be re-established the patient's life is a matter of days, but why is no urine formed? What has happened to the renal blood-flow, to the glomerular blood-pressure and the filtration rate? These are questions few would care to discuss, much less to answer. Why does the patient die? This again is a poser, but at least one can turn to experimental medicine for assistance. Hoff, Smith and Winkler [1] have found that if the ureters are tied off or the kidneys removed in the dog there is a rise in the serum potassium from the breakdown of the animal's own tissues. They believe that the cause of death is cardiac arrest due to potassium poisoning, and have produced reasonably good evidence in favour of this view by following the serum potassium and the electrocardiograms of all their animals. They have also injected potassium into normal and anuric dogs and shown that death takes place not when the blood-urea rises to a great height but at or about a critical level of serum potassium; and they have shown also that the changes in the electrocardiograms at death are in all cases those of potassium poisoning. There are, however, some unsatisfactory aspects of this theory. Hoff and his colleagues admit that in mercuric chloride poisoning an accumulation of potassium is not the cause of death, and the same is true of clinical uræmia. Moreover, they have ignored some stimulating work done on this subject more than ten years ago in Hungary. Kerpel-Fronius and Leövey [2] came to the conclusion that the cause of death in anuria and uræmia was a rise in the general osmotic pressure of the body to a level incompatible with organised protoplasmic metabolism, and they substantiated their argument by showing that the administration of either sodium chloride or urea to anuric animals accelerated their demise. This is an attractive theory, and there seems good reason for investigating the subject further.

PAPWORTH

THE report for 1941 makes it clear that the Papworth Village Settlement is progressing in spite of war-time difficulties, and with Sir Reginald Wingate as chairman, Mr. Peter Fraser as director, Dr. Donald MacCallum as chief MO, and Miss K. L. Borne as lady superintendent, its future is in safe hands. The social and economic implications of tuberculosis are well known—Farr, Newsholme, Hoffman, Biggs and others have repeatedly shown it to be a source of serious financial loss to the community in wage-earning power and efficiency, besides bringing many of its victims to poverty or even destitution. The triumphs of curative medicine in securing arrest of the disease too often prove Cadmean victories unless the sociological side of the case receives attention. "The average consumptive leaves the sanatorium in a state which is little better than an equilibrium between attack and defence." [1] Such a patient is a damaged life. He needs care and medical supervision for a long time especially during the critical five years following arrest of his disease. Put into competition with healthy labour more often than not he breaks down under the strain, his old disease flares up and his last state is worse than the first. Sir Pendrill Varrier-Jones coped with this aspect of the tuberculosis problem by the establishment of the Village Settlement and its industrial departments. At the same time he provided treatment for all stages of tuberculosis. He studied tuberculosis in the individual patient and based his study on clinical experience. The treatment given at Papworth is adapted to the needs of the individual patient alike in the hospital ward, the sanatorium shelter or the workshop. Varrier-Jones realised the prōtean and fluctuating nature of tuberculosis. This broad outlook is the secret of Papworth's success.

BLOOD TO THE FEMORAL HEAD

THE management of fractures of the femoral neck is rapidly becoming standardised; in most clinics medial fractures and many of the lateral fractures are treated by the insertion of a Smith-Petersen pin supplemented in some cases by a bone-graft. The use of screws, multiple Kirschner wires or bone-grafts alone appeals to a minority, but all agree on the necessity for accurate reduction and reconstruction of the femoral neck by an extra-articular operation under radiographic control. As the variable factor of mechanical accuracy approaches the ideal the end-results will come to depend more and more on the initial injury to the blood-supply of the head. That success or failure in obtaining union after a careful operation is determined largely by this element of avascular necrosis has been emphasised by de las Casas,[2] who deprecates the use in all cases of the Smith-Peterson operation. He concludes from injection studies that the ligamentum teres contributes little or nothing to the blood-supply of the head, most of whose vessels run medially from branches of the circumflex arteries. The more medial the fracture the greater is the danger of complete severance of these branches, and if the fracture is nearer the head than the middle of the neck avascular necrosis becomes a strong probability. In more lateral fractures the blood-supply may be inadequate for union even if the head has survived, and many cases that do unite develop a severe degenerative arthritis as a late complication of necrosis. For these reasons de las Casas does not attempt the reconstruction of medial fractures but excises the femoral head as primary treatment in all cases, adding an abduction osteotomy at the lesser trochanter whenever the patient's condition allows. Lateral fractures are treated by bone-grafting except when the Smith-Petersen pin—which he thinks contributes to the danger of necrosis—is used; he reserves this as a rapid procedure for feeble patients.

Many will consider these views on treatment of medial fractures both too sweeping and too pessimistic, for there is evidence [3] that, in good hands, the pinning operation secures bony union in about 70% of cases. At a discussion on avascular necrosis at the Royal Society of Medicine [4] Watson-Jones said its incidence after the closed operation is only about 15%—though this is doubled when an open exposure involving capsular

1. Hoff, H. E., Smith, P. K. and Winkler, A. W. *J. clin. Invest.* 1941, **20**, 607.
2. Kerpel-Fronius, E. and Leövey, F. *Arch. exp. Path. Pharmak.* 1929, **144**, 372; *Ibid*, 1931, **159**, 236.

1. *Lancet*, 1939, i, 31.
2. De las Casas, H. *J. int. Coll. Surg.* 1942, **5**, 98.
3. See *Lancet*, 1941, ii, 316; 383.
4. See *Brit. med. J.* 1942, i, 503.

damage is employed—and that the insertion of the pin increases neither the frequency nor the severity of this complication. Brailsford,[4] however, considers that the destructive changes in the hip-joint following necrosis are worse after pinning than with external splintage, since a false sense of security encourages too early weight-bearing. The pin itself may cause added vascular damage. Both agree that the relative density of the head which is the earliest radiographic sign may be masked by early functional activity which minimises the contrasting disuse rarefaction of the rest of the bone. Recognition of avascular necrosis, which ought to be made at 6–8 weeks, may thus be delayed for many months, and it is important therefore to keep patients quiet in bed for 3 months after the operation. This is probably of some positive value in preventing further injury to the blood-vessels of the neck during too early walking, when the pin is the only form of support.

It is well to be reminded that there is a biological as well as a mechanical side to this problem; and no-one will deny de las Casas's thesis that each of these fractures must be treated on its individual merits and not as just another opportunity for what may be a strikingly successful operation.

THE RIDDLE OF ARTERIOSCLEROSIS

Is the problem of arteriosclerosis the modern equivalent of the age-long search of the alchemist? Are we dealing here with that strange conumdrum, the secret of senescence? Observations accumulate and refuse to fit into any coherent design, and perhaps we are still only at the stage when relevant material should be noted and filed for future reference. The latest contribution to the subject comes from a large department store in New York, where Lake, Pratt and Wright[1] have studied the incidence of arteriosclerosis and varicose veins in 536 employees of both sexes over 40 years of age. They divided these into four occupational categories: those sitting (e.g., typists); those standing (e.g., lift-operators); those walking (e.g., porters); and those climbing stairs (e.g., delivery men—it seems that nearly 10% of the employees climbed stairs "most of the time"). The lower limbs only were examined and conclusions were based on a history of pain on walking relieved by rest, inspection of rubor on dependence and pallor on elevation, palpation of the arteries and veins, oscillometric studies, and radiological examination of the soft tissues. Many results were invalidated by the smallness of the subgroups, but a few are striking. Thus the total incidence of arteriosclerosis was 35% (46% for men and 20% for women) and arteriosclerosis appeared to develop a decade later in women than in men. Among the younger men (age 40–49) work which demanded stair-climbing seemed to produce a significantly higher incidence of arteriosclerosis (38%) than sedentary or standing work (21%); but this difference did not apply to women. The men had a much higher incidence of calcification in the arteries than the women, but the use of alcohol or tobacco could not be shown to have any correlation with the presence or degree of arteriosclerosis. As might be expected, the incidence of arteriosclerosis was higher in hypertensives than in those with normal blood-pressure, though it is noteworthy that 63% of the men with hypertension had arteriosclerosis compared with only 28% of the hypertensive women. The relation of varicose veins to arterial disease proved interesting; 73% of subjects over 60 years had varicose veins; taking all subjects, 67% of women who had never been pregnant had varicose veins compared with 41% of the men. Women who stood or walked showed a much higher incidence of varicose veins than those who sat—a difference not found among the men. In both sexes there was a higher incidence of arterial disease in those with varicose veins, but the correlation was not statistically significant in women, though it was in men. The sex difference in the incidence of calcification of the arteries can be correlated with the observation of Ludden, Bruger and Wright[2] that in female rabbits fed with cholesterol the development of hypercholesterolæmia was inhibited, and the deposition of cholesterol in the aorta prevented, by the administration of testosterone propionate or œstradiol dipropionate; whereas in male rabbits no such inhibition was found. This suggests that the relative infrequency of arteriosclerosis in women may be partly due to the presence of the ovarian hormone. Tobacco and alcohol have once more been cleared of responsibility for arterial disease though without prejudice to the possibility of tobacco's vasospastic effect in patients with obliterative arterial disease.

SAVED MILK AND SAFE MILK

CIRCULAR 2669 of the Ministry of Health is solely concerned with milk as a perishable food. Its aim is to reduce loss of milk from souring or tainting and to safeguard the keeping quality of bulked market milk. It proposes to do so by instituting a system of examinations of milk using certain standard tests. These as far as practicable will be carried out in trade laboratories but under the control and supervision of the provincial dairy bacteriologists, who are already in existence. These bacteriologists will arrange for frequent check tests to be made by their staff. The actual tests to be used are not disclosed. Three categories of producers' milk are proposed—"market" milk, satisfactory for the liquid milk market; "salvage" milk, unsuitable for the liquid market; and "rejected" milk, to be returned to the farmer. Salvage milk will be at the disposal of the Ministry of Food, who will whenever practicable arrange for its salvage, manufacture or disposal, and who will determine the price to be paid for it. (If salvage is impracticable the milk will be returned to the producers.) While the scheme will mainly be applied to depot or creamery bulked milk all supplies of milk, including designated milks, delivered from farms will be liable to test. This scheme is however additional to existing regulations including those for designated milks, and the minister asks local authorities to maintain their work under these various orders and regulations. The advisory work will be undertaken by the county war agricultural executive committees through their demonstration subcommittees. The scheme involves price differentiation on a quality basis, prices being decided by the Ministry of Food in consultation with the Milk Marketing Board. Milk legislation is already very complicated and this scheme adds to the burden already on the shoulders of the farmers and milk producers. That it should be necessary is part of the penalty to be paid because Government departments have shirked handling the milk problem firmly. Procedures have been adopted which do a little good at the expense of much administrative effort, but never go to the root of the problem. The latest Government action is intended to conserve milk from becoming unsaleable, but leaves untouched the need for making it safe from the risk of spreading disease, in spite of urgent medical representations. Much of the extra milk now allocated to young children and school-children is just "milk," like Hamlet's father unanel'd, no reckoning made but sent with all its imperfections on its head. Some part of the increase of human tuberculosis during the present war may turn out to be due to the greater consumption by children of milk infected with the bovine bacillus. Where pasteurisation of milk for schools is impracticable it would probably be better to supply dried milk.

1. Lake, M., Pratt, G. H. and Wright, I. S. *J. Amer. med. Ass.* 1942, **119**, 696.

2. Ludden, J. B., Bruger, M. and Wright, I. S. *Arch. Path.* 1942, **33**, 58.

In England Now

A Running Commentary by Peripatetic Correspondents

WHETHER or not there is any alteration in medical practice after the war, I would advocate the compulsory holding of a DC—Diploma in Consultancy—for anyone proposing to take up consulting practice; before admission to the examination the candidate to be not less than thirty and to have had at least two years in general practice including contract work. My board of examiners would consist of three general practitioners to every one consultant, and two attempts only would be allowed. The examination, to be held not more than twice a year, would entail first a half-hour paper, which would include the writing of two letters to doctors in proper style for hypothetical referred cases, marks to be given mainly for practicability of suggestions, and questions such as "What would you say to (*a*) the patient and (*b*) the relatives if your findings were such and such?" The other part of the examination would be a pretty stiff viva, 25% at least of the marks to be given for general appearance, manner &c. "Relatives" would be interviewed, awkward prearranged questions by "patients" would have to be answered, and a "talk about the case" would be made with one of the examiners acting as the GP. I haven't thought what I would do with the proceeds of the examination; perhaps if the fees were fairly high there would be enough to start a Consultants' Benevolent Association—run by GPs.

* * *

I saw a crap game in the tube today. The last time I saw one was in the Pullman wash-room during a wearisome journey on a public holiday from New York to one of the Canadian cities. The train started soon after breakfast and arrived sometime the same night; I don't know quite when for I was not allowed to be present. Although the United States was our ally, British subjects not resident in the Western Hemisphere were classed as aliens and treated as such. Regulations required that travel papers should be handed to officials who are responsible for advising the immigration officer if the said alien wants to leave the country. With the full assurance that everything was in order I started off for Canada. The snow got deeper, the daylight faded, the passengers left one by one, and for many miles only a few remained. The tedium was relieved somewhat by the intelligent conversation of the coloured porter in the car. He was not the only man I met in the United States who seemed quite unaware of the real conditions in England in wartime and the sacrifices demanded of, and willingly submitted to, by our general population. The supposedly intelligentsia were amazed to hear in detail about things we regard as commonplace—rationing, taxation, and how John Citizen spends his day. It is comforting to know that steps have been taken to promote a better understanding in the United States of the British outlook today. Canada is, of course, as war minded as we are, anyway in the Eastern Provinces.

The train stopped at the frontier. A squad of Customs and Immigration men descended on me. The Customs, observing my nationality, made their examination the merest gesture, I suppose so that they could give pride of place to Immigration. Immigration was very fierce as I deferentially handed over such identification papers as I still possessed. The man seemed rather undecided about me, so I explained that additional papers should be in his possession, and actually he had to my knowledge been officially advised that I wanted to cross the frontier. Other officials now joined my questioner and after a brief consultation they announced that I must accompany them for inquiries. Despite the fact that there would be no further train for 24 hours I was neatly assisted from this one, realising that I was more or less under arrest on suspicion. Traditional English teaching is to "come quietly," which I did, feeling that it was wiser to accept the inevitable gracefully. One interest of life is to appreciate skill in others. The polite firmness with which I was escorted through the darkness across the station yard and right into a waiting car was unexceptional and a breakaway would have been impossible. There was a drive of about a mile to the frontier post, opposite the entrance of which the car drew up so that its door opened against one side of the entrance while the open side was filled by a man who emerged from within. "I see you've got someone," he said to my guardian. Evidently a catch relieved the monotony of frontier life particularly on Christmas night when business was slack.

After further questioning and scrutiny of my papers it was announced that as immigration headquarters had not yet notified the frontier of my existence I should have to wait until the next day, if not longer, till the business was regularised. I explained that I was not travelling for my health and that I was due for important meetings the next day. Later, one friend whom I spoke to on the telephone, and with whom I had an appointment, offered to journey through the night to identify me. His offer had to be refused because nothing short of strict compliance with regulations seemed to be of any avail. A little disquiet was now softening the general attitude to me, and as a concession I was told that I could spend the night at the inn if I preferred this to a wooden bench in the frontier post, so I was driven in a taxi to a nearby village where I checked in at the local. This establishment was run by a French Canadian who took the circumstances of my arrival as a matter of course; he did a regular trade with people stranded like myself. We conversed in both English and French, but I realised then and subsequently in that region that the French they speak differs materially from that spoken in Europe, not so much in the words perhaps but in their pronunciation. After being allotted a pleasant little room, even in this outlandish spot fitted with running water and other refinements, I adjourned to the bar, there being nothing else to do. The landlord had already announced that there was someone from London around so conversation and questions soon started. I was the second European within a few days to be stopped. It was easy to recognise who the other man had been—a Frenchman I had met on various previous occasions. He must have created an all-time record by his journeys in Europe and across, to and into the United States with only a sheet of notepaper for credentials, yet he met his match here, far removed from war or thoughts thereof.

A special brew of the pub was a rum punch called Tom and Jerry. The recipe and name, I was told, came from Huntingdonshire, England, where it was said to be a special Christmas brew. It had been introduced to these parts by the early settlers. So far I have had no chance to check its history, but I can testify to its soothing qualities in time of trouble. I was rescued next morning.

* * *

When I was a student like many another I grappled with Cut and Comeagain's Manual—one might almost say Bimanual—of Surgery. I had to transpose C and C's formal diction into a picture, except when they provided one for me, and then I had to reduce that picture to words of my own more simple vocabulary. All this in order that I might be able to answer the examiners' questions clearly and to the point, but above all and everything to answer the questions. Ten years later when I was surgeon on a steamer I was sent for by a passenger in one of the cabins de luxe and found he was none other than the great Comeagain himself, retired and on a world tour. For some weeks I felt myself one of the elect in that I was treating this great man, who was kindness itself to me and told me many anecdotes, some of them even derogatory of Cut. It was as though while out for a country walk one happened to climb Mt. Olympus and running into Zeus was not only asked to prescribe for him but also was regaled with pleasantries, "Have you heard this one about Apollo?" The conceit engendered by this lofty association must be my excuse for daring to criticise the interim report of the BMA Medical Planning Commission on a fundamental point. Before we have read six lines what an amazing thing do we discover! The terms of reference, the very charter of the commission's existence, says that they are "to study"; not a word about suggesting or planning, just to "study war-time developments and their effects on the country's medical services both present and future." Though how in the name of Heaven one can study future events I don't know. Speculate about, yes, but then they are not licensed to speculate, only to study. This foundation-stone sentence is certainly a flimsy basis for changing the whole structure of British medicine. It is like getting an order from the coroner

to perform a necropsy, and going on to hold the inquest oneself, arrange the funeral, and then issue a majority report in favour of "Nearer my God to Thee" on the tombstone, while the minority favours "Peace perfect Peace." Blue pencil, please.

* * *

He has one of those lean, immobile faces the expression on which seems to say: "Go on. Impress *me*. Make *me* laugh—if you can." When he looks up or down or sideways he appears not to move his head at all but his eyes, restless and steely-blue, miss nothing. By occupation he is a doctor's man of all work and this involves a good deal of rabbiting and the care and management of shooting dogs which he trains himself. His present dog is a sound worker, obedient and devoted to a master no less devoted to him though sparing of caresses or praise; indeed, in conversation he usually refers to the dog as "that black beggar"—especially when the dog very sensibly jibs at working out some particularly thick and uninviting briar-patch through which his master stoically plods his way beating and stabbing with his long stick. Seeing him one day stand stock still with head slightly bowed I guessed that he must be looking upward at something, so I worked my way round him till I could see his eyes. Following the direction of his gaze I saw it was riveted on a crow's nest fixed in a fork near the top of a tall oak. To those with a gamekeeper's outlook on life crows are anathema. "There's mebbe a brood o' young 'uns there," he observed and, without more ado, strode across and began to climb the tree as nimbly as a cat. In a matter of seconds he had reached the nest and reported it empty but on general principles he overturned it before climbing down. I congratulated him upon his agility but he made nothing of it. "'Tis all 'coordin' to what you'm used to," he said. I only hope that I shall be able to climb half as well when I'm 62.

* * *

Morale is most important in a hospital ward, and it has always puzzled me why it varies from time to time and from place to place. No doubt the mumbo-jumbo men know the real explanation, but the simple-minded surgeon must look for simple explanations. Everything in this hospital is done by orderlies, who before the war were anything from clerks to coalminers, but now, clothed in masks (see MRC War Memo No. 6) and armed with forceps, maintain a terrifyingly inaccurate but so far successful asepsis in the wards. They are keen and cheerful—they organise a football team, a dance band, and a concert party. The last is my great rival and I often have to remind men and even colleagues that we are a hospital and not an academy of concert-party art. But I am not hostile; I go to their performances and await with horror the man who has sung the same sentimental song ever since the war started; and I revive the thrills of a child at the circus when we come to the strong man and acrobat turn. These wonderful men seem able to do anything; especially do I like Private X who solemnly turns somersaults across the stage holding the *Times* in his hands and pretending to read it. Last night I was chatting to the night sister. "Yes," she said, "I heard all the patients shouting early this morning, so I rushed into the ward. I had sent Private X to do a fomentation at the end of the ward. He was holding the foment in his hands and doing somersaults down the ward as fast as he could and everyone was sitting up in bed cheering him." I laughed. "But," she cried, "what's the use of his wearing a mask and gown if he does that?" But the morale is good in that ward.

* * *

I was asked to help clear out the medicine cupboard of an aunt recently dead. She had been an old lady of meticulous habits and everything was neatly labelled. On one bottle, lest there should be any possible mistake, she had carefully printed, "Cascara, I think."

* * *

We were on a ward-round with a number of GPs, and the patient had either ascites or an enormous cyst. Two of them began conferring; eager to anticipate a question, I edged across in time for the last sentence. "Yes, my goodness," said one of them, with more interest in the patient's household arrangements than I could readily countenance, "*she'd* fill her bath."

MEDICINE AND THE LAW

Procaine and Percaine

A RECENT inquest at Banbury revealed a dispenser's mistake. She received a written slip from the theatre sister asking for one gramme of procaine. Thinking procaine and 'Percaine' to be similar substances, she used crystals from a bottle of percaine and labelled the solution "procaine." Giving evidence before the coroner, she said that she had heard of percaine but had never dealt with it in the pure drug form; she was so convinced that procaine and percaine were identical that she did not consult any book.

The patient had been admitted to hospital after an accident: his chest was crushed and skin-grafting was necessary. For the third of these treatments, four months after the accident, the surgeon decided to use a 5% solution of procaine as a local anæsthetic and asked the sister for this. The operation was finished by 3.15 P.M., but the patient almost immediately had a convulsion and followed it with six more in the next quarter of an hour; he was dead before 4 o'clock. Dr. Alastair Robb-Smith, of the Radcliffe Infirmary, Oxford, conducting a post-mortem examination, found death was due to heart-failure and shock. The solution in the bottle, on being analysed, was found to be a solution of percaine. The witness explained that the normal maximum dose of procaine was two grammes; the surgeon had injected 1·25 grammes, a perfectly safe dose if the substance had been procaine. Percaine had a quite different action, more powerful in its anæsthetic properties and more toxic; the safe dose for an adult was reckoned as 0·12 gramme. The patient had been given ten times the maximum dose; this was the immediate cause of death. Dr. Robb-Smith said it was unfortunate that names so similar as percaine and procaine should be employed.

Shock due to Noise

To be negligent is to take the chance of having to pay damages to anyone who suffers injury in consequence. If a negligent motorist (the negligence which occupies the judges' attention is usually negligence in the use of a motor vehicle) breaks a pedestrian's leg, the case is easy. If the injury takes the form of nervous shock, if there has been no physical impact but merely the apprehension of an impending or immediate accident, there may be a question whether the damage is not too remote to be actionable—whether, in fact, the motorist could reasonably have foreseen this particular consequence and his want of care. In Bourhill *v.* Young the House of Lords has lately decided an interesting case of this kind. The plaintiff suffered from shock merely through hearing the squeal of the brakes and the crash of the colliding vehicles in the distance.

Mrs. Bourhill, explained Lord Thankerton, was a fishwife who was travelling on a tramcar near Edinburgh on Oct. 11, 1938. The tram stopped at a stopping-place just short of a crossroad. She alighted and went round the near side of the tram to lift her fish-basket from the off-side of the driver's platform. A motor-cyclist, travelling at an excessive speed, was going in the same direction as the tram; he collided with a motor-car at the crossroads, was thrown on to the roadway and received fatal injuries. Mrs. Bourhill neither saw nor heard the cyclist previously; she knew nothing of him until she heard the sound of the crash when the vehicles collided. At that moment she had her back to the driver's platform and the driver was helping her to get the basket on to her back and the broad leather strap on to her forehead. The scene of the collision was about 45–50 feet away from her. After the motorcyclist's body had been removed, she approached and saw the blood left on the road. Her case was that as the result of the collision she wrenched and injured her back, was terrified and suffered severe shock; she was about 8 months pregnant and gave birth to a child on Nov. 18 which was stillborn, she alleged, as the consequence of her injuries. The trial judge took the view that the noise of the accident caused a nervous shock but that she had not proved that the stillbirth or the injury to her back resulted from the shock or her immediate reaction to fright due to the noise. The shock disabled her from carrying on her business for a time; there was thus a sufficient

finding to raise the question of the dead motorcyclist's liability. The problem was the extent of the latter's duty towards other passengers on the road. Clearly he must ride with such reasonable care as would avoid the risk of hurting anybody whom he could reasonably suppose likely to be injured by his failure to use reasonable care. It is settled law that the injury may include injury by shock without physical impact or lesion. There must, thought Lord Thankerton, be an area of potential danger which the cyclist ought reasonably to contemplate as likely to exist in consequence of his negligence. Was Mrs. Bourhill within that area? Lord Thankerton was clearly of opinion that she was not.

Previous leading cases have arisen out of some carelessness in the control of a motor vehicle. A lorry-driver leaves his lorry imperfectly braked and unattended at the top of a hill. It starts off downwards and a mother, seeing the uncontrollable monster gathering pace, suffers shock from fear for her child who, she thinks, is playing in the road below. But in the Bourhill case the motorcyclist had his cycle under control, though he was exceeding the proper speed. Did he owe Mrs. Bourhill any duty? She was not within his range of vision; the tram obstructed any view of her; he was well past the tram when the accident occurred. Ought he to have thought that his machine might ricochet and hit her or that falling glass might strike her? Lord Thankerton thinks the motorcyclist need not have imagined any such contingency. Mrs. Bourhill based her claim merely on sound, not on apprehension of an impending collision. The volume of noise afforded no ground for argument. A plaintiff claiming damages for negligence must establish some breach of duty on the defendant's part. Mrs. Bourhill failed to do so. She therefore lost her case, and the trend of judicial decisions (which had been favourable to plaintiffs in these cases of shock) for the moment suffers a setback.

CUTTING DOWN QUININE

IN March of this year the Ministry of Supply announced that supplies of quinine in Great Britain were adequate and would last for some time, and that steps were being taken to ensure that sufficient stocks would be available for the next year or two. Most of the world's supplies come from Java, however, and it has now become necessary to husband our stocks rigidly so that malarial patients can have first call on them. Under his emergency powers the minister has arranged that, from Aug. 13 onwards, cinchona, cinchona products and synthetic substitutes will be controlled. The controlled material thus includes any bark (whether whole, ground or crushed, or in any other form) from any variety of cinchona, and any preparation made from it; any alkaloid derived from such bark, and any "salt of any alkaloid; any totaquina or quinetum; any mixture of cinchona alkaloids; any cinchona febrifuge; or any synthetic product or material which according to current medical opinion is a specific for malaria. The controlled materials will only be supplied to the following: anyone holding a medical prescription for a quinine preparation; any hospital authority, retail pharmacist or doctor, provided he keeps within a fixed limit (calculated as quinine, 25 oz.); any patient holding a medical certificate or a document from a Government department stating that he has, or has had, malaria; anyone requiring it for use as part of the medical stores of a ship; any Government department; and anyone authorised to obtain material on behalf of the Minister of Supply. Doctors are at liberty to write prescriptions containing quinine for any patient, whether malarial or not, whom they consider needs it; but since it is essential for the treatment of malaria, the minister is confident that doctors will not order it for colds or other ailments which can be treated with alternative remedies. Quinine has also been withdrawn from many preparations, proprietary and other, in which it was previously used. For some time it has been left out of tonic water and quinine drinks, and it has already been omitted from Easton's syrup. All holders of stock containing 25 oz. or more of quinine must notify the Director of Medical Supplies, Ministry of Supply, Portland House, Tothill Street, London, S.W.1. Copies of the order may be obtained

Continued at foot of next column

Letters to the Editor

DIPHTHERIA IN INOCULATED PERSONS

SIR,—Dr. Glover and Professor Wright, in their analysis of the results of diphtheria immunisation in Liverpool, say that "the response of the people of this city to the offer of inoculation free of cost has been most disappointing." Their disappointment must be shared by doctors all over the country. If, however, one compares the meagre insignificance of the propaganda on behalf of diphtheria immunisation with the prominent and ubiquitous boosting of So and So's infallible remedy for such and such one realises why the "offer" of free immunisation often never reaches, or at least fails to impress the public. Must the arts of propaganda be used solely to boost worthless placebos for the profit of their manufacturers or would it be justifiable to use these well-tried methods for the public good? Better publicity is one necessity; another is ready availability. The striking difference in incidence of immunisation among school-children and among preschool children (31% and 6% in the paper quoted) is no doubt due to the fact that arrangements are often made in schools for the inoculation of its pupils, whereas the mother herself is responsible for taking her younger children to a clinic, which may be some way off, up to five times (the actual number of attendances differs in the various clinics). Finally, many doctors themselves are indifferent to the matter. If every doctor, nurse, health visitor and welfare worker impressed on every parent with whom they had professional and social contact the urgent necessity of diphtheria immunisation it might in time become a social disgrace to have a child known to be unprotected against this deadly disease.

West Middlesex County Hospital. PATRIA GAIRDNER.

TUBERCULOSIS IN NURSES

SIR,—I should like to comment on two points in your correspondent's report from the press gallery (*Lancet*, Aug. 8, p. 172). In regard to the shortage of nurses, is it not time that the state made some provision for those nurses unfortunate enough to contract tuberculosis in the performance of their duties? Here are two examples of what may now become of them:

A state-registered nurse contracted tuberculosis while nursing in a well-known chest hospital some 9 years ago. She went to a sanatorium for treatment and after some time was put on the nursing staff. She crocked regularly each year, and 2 years ago she was told that she would never work again. The medical superintendent of the sanatorium was kind enough to say that she might make her home there for the rest of her life. Her only money is 2*s*. a week total disablement benefit. This is all she has to provide herself with luxuries and necessities—even clothing.

Another contracted this disease in a general hospital at the age of 21 or 22. She also went to a sanatorium, and 4–5 years ago was told that she could not work again. She accepted the offer to stay on at the sanatorium for life, and her only income was 3*s*. 6*d*. a week total disablement benefit. She was really entitled to 6*s*. but 2*s*. 6*d*. had to be allowed to accumulate because she was in a hospital (see Ministry of Health Leaflet No. 35, 1938). The fact that she would never leave the sanatorium alive made no difference to her approved society. After her death I saw an advertisement stating that there was an estate of £25, and asking for next of kin to claim it. This money, had it been paid to her, would have made her life a little easier.

Knowing of these cases, and many others, I feel it unjust to direct nurses lightly into this work, which may,

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from H.M. Stationery Office. It is encouraging to know that thanks to the enterprise of an American officer, a quantity of cinchona seed has been safely brought from the Philippines. A correspondent in the *Times* of Aug. 15 recalls that Lieut.-Colonel A. F. Fischer, who was chief of the Philippine Forestry Service for a long time, introduced the cinchona plant to those islands. During the defence of Bataan and Corregidor he supplied quinine to the troops, and when the situation became critical he flew to Australia with large supplies of selected seed.

after all, end in the plight outlined above. I am not suggesting that the risk of infection is great—it is certainly no greater working in a sanatorium than in the tuberculosis ward of a general hospital—but it does exist and it is time some financial protection was offered to nurses undertaking this work. It is ridiculous to compare them to fighting men who, if incapacitated, do at least get some pension.

It is lamentably true that "the rehabilitation of the tuberculous patient has not been sufficiently provided for in the past" and it is to be hoped that "the maintenance and subsidising of tuberculous patients from the time they leave the sanatorium till they return to full employment" may become so at some *early* future date. When a patient leaves a sanatorium, invariably not yet fit for work, if he has no home he must apply for public assistance. I doubt if it is generally known what rudeness and cruelty is meted out to such patients, even when they have a letter from the almoner of the hospital where they are having treatment. Most relieving officers are clearly ill-fitted to discharge this duty.

A girl who applied for relief with such a letter was asked by the committee what money she had in her bag. On saying that she had 5*s*. she was told that she must apply when she was destitute. The 5*s*. had been loaned to her and she was, in fact, penniless. After an unpleasant scene, during which she was told that it was her duty to get well as soon as possible and not be a drain on the community, she was allowed 25*s*. a week, out of which she had to buy 2 pints of milk a day if she followed the advice of the hospital. The sum was paid but the manner in which she was treated was so unpleasant that she returned to her lodgings with a temperature of 100° F. saying that she would rather work and die than remain on PA. In fact, she crocked again within 6 weeks or so and returned to hospital, costing the state a good deal more than 25*s*.

I feel this sort of thing should be brought to the attention of the medical world.

Harrow. E. D. ANDREWS.

THE MILK FACTOR IN CANCER

SIR,—Few indeed must be the themes in biology and medicine which have entirely escaped discussion in the older records, even—perhaps usually—when evidence was scanty or lacking. Sir Alfred Webb-Johnson's letter in your issue of Aug. 8 shows that the milk factor in the transmission of disease of sucklings is no exception, since the subject had occupied the attention of philosophers from very early times. More specific conjectures, relating to a milk factor in the transmission of cancer-susceptibility, appear however to be rare, so that the following may be of interest (F.-J.-Léon Rouzet, *Recherches et observations sur le cancer*, Paris, 1818, pp. 317–8):

"L'hérédité du cancer une fois reconnue, on voit de quelle importance il est de remettre l'enfant nouveau né à une nourrice étrangère, lorsque la mère a présenté, soit avant, soit pendant la grossesse, quelques symptômes cancéreux; puisqu'il n'est guère douteux qu'elle ne communiquât à son nourrisson en l'allaitant cette disposition au cancer à laquelle il avait peut-être échappé pendant l'époque de la gestation."

On the same subject Rouzet also refers the reader to Portal (*Maladies héréditaires*, p. 74 et seq.) and to Petit's article in the *Dictionnaire des sciences médicales*.

London, S.W.3. ALEXANDER HADDOW.

SUBLINGUAL THERAPY IN ADDISON'S DISEASE

SIR,—Having read Dr. Andrew Wilson's article of June 27 with much interest I would like to quote one case in which we tried sublingual therapy.

A tractor driver, aged 17, working on a farm, was admitted to hospital on Jan. 16 complaining of anorexia and vomiting. He had been well until 2 weeks previously when his symptoms developed rapidly with well-marked lassitude, but no shivering, gain or cough, and no headache or giddiness. On admission he was extremely apathetic and drowsy, and was deeply pigmented a homogeneous brown, especially on hands, face, axillary folds and nipples. BP 60/45 mm. Hg. The condition of his mouth was very bad and there was much pus on the tonsils. He was treated with 'Eucortone' 10 c.cm. t.d.s. intramuscularly and rectal saline when the vomiting was most severe. By Feb. 10 there was considerable improvement with no further vomiting and pigmentation; drowsiness was definitely less. His BP was now 96/64 mm. Hg. The eucortone therapy was then altered to 'Doca' 7·5 mg. daily intramuscularly. On Feb. 23 his general condition was further improved; BP 105/64. Additional salt (15 g. daily) was being added to his normal diet. Doca sublingual tablets were then substituted, and he was given one 2·5 mg. tablet five times daily (12·5 mg. daily). He was instructed to keep the tablet under the tongue until it was fully dissolved—not to suck it. During the next week he developed an obstinate stye of his right eye. He became a little more drowsy and the pigmentation became rather more definite; doca 5 mg. daily by intramuscular injection was therefore given in addition to the tablets. Very soon there was an improvement and by March 18, when the stock of tablets was temporarily exhausted, his BP had reached 122/86. The patient had put on weight and was feeling very well, though he was still kept in bed. For 6 days, the doca intramuscular injections were cut down to 5 mg. on alternate days but almost at once there was a change, with the onset of sore throat and pyrexia. The injections were then made daily but by March 29 the BP had fallen to 96/64; temp. 101° F. There was more pigmentation, much nasal secretion and severe asthenia. The injections were increased to 10 mg. daily, with a rapid response in the general condition. This dosage was maintained and the subsequent improvement was steady. By April 23 (3 weeks later) the BP was 132/80. The patient was again putting on weight and the pigmentation was beginning to fade. He was then allowed to get up; this was not accompanied by any ill effects while there was no obvious weakness. With a further supply of doca sublingual tablets, a second course was begun on May 7 and for 3 weeks the patient was given twice the previous dose (5 mg. q.d.s.). There was no obvious change but at the end of the 3 weeks he had definitely relapsed a little—BP 100/76, with the pigmentation more definite and greater asthenia. He became obviously more apathetic and drowsy. An additional 5 mg. of doca was then given by injection daily with rapid improvement. The tablets were discontinued on June 6 and a further 5 mg. injection substituted. On this dosage (10 mg. daily), as had been proved before, the patient remained very well; BP 120/85. When discharged on June 17 he had put on weight, and the pigmentation was a good deal paler. He was able to live a quiet life without any obvious tiredness. At no time during the treatment was there any œdema. Incidently, the pathology of the constitution was almost certainly tuberculous as an X ray of the chest revealed some soft infiltration of both lungs, with a slight opacity above the right renal shadow.

From these two courses of sublingual doca it seems that at least 20–30 mg. daily would have been necessary for maintenance, compared with the simpler 10 mg. injection.

My thanks are due to Dr. H. S. Morley for permission to publish the case and to Messrs. Organon Laboratories for providing the doca in sublingual tablets.

M. P. HUTCHINSON.

Royal West Sussex Hospital, Chichester.

DIGESTIBILITY OF WHEATMEAL

SIR,—Dr. Wright does not seem to have taken much notice of the devastating criticism which his first article has aroused (Bacharach, A. L. *Chem. and Ind.* 1941, **60**, 791. Fraenkel, G. *Ibid*, 1942, **61**, 84. Lester Smith, E. *Ibid*, 1941, **60**, 695), and still maintains that a switch-over from 75% to 85% extraction seriously upsets the balance sheet of the national diet. It is of course true, as has been officially stated, that higher extraction results in a loss of wheatfeed and consequently a reduction in milk production. But it also saves annually some 700,000 tons of wheat imports if the same quantity of flour is milled in both cases. In more normal times this shipping space can still be used for importing feeding stuffs and the cattle then receive just as much under a brown as under a white bread policy. It is, therefore, not the brown bread policy as such which deprives the cattle of their food but the necessity of saving shipping space. If this shipping space must be saved and white bread is to continue, there must be a reduction of about 12% in the bread eaten. It seems hardly likely that Dr. Wright or anybody else would recommend this latter procedure which would represent a much more serious loss of calories and of protein than that which adoption of wheatmeal bread is causing. Therefore, with the present shipping position, the

wheatmeal bread policy is in every important respect—protein, calories and vitamins—a far superior solution. If there were no shipping difficulties we would have the dietary advantages of wheatmeal bread without losing a pint of milk. Even if Dr. Wright's claims on digestibility of National Wheatmeal were right, which seems doubtful, the loss of protein under such a scheme would be almost negligible (4000 tons p.a.), as I pointed out elsewhere, and there would be no loss of calories.

Imperial College of Science and Technology. G. FRAENKEL.

AIR ENTRY THROUGH TRANSFUSION SETS

SIR,—In his article of Aug. 8 Mr. Devas throws an interesting light on the possible results of air leaks but he makes no mention of their commonest cause. It often happens that a patient having a transfusion of saline or blood suddenly requires the immediate intravenous administration of some drug such as 'Coramine.' The quickest and most convenient method of doing this is, of course, to inject the drug into the tubing of the transfusion set with a hypodermic syringe. Unfortunately, this is only too often the cause of a permanent air leak. This sabotage of the transfusion set is permissible where the patient's condition calls for instant interference but even in these cases the less damage done to the set the better. I suggest that it should be a firm rule in every hospital where the standard sets are in use that this "needling" of the tubing should only be allowed in the six-inch length immediately proximal to the cannula. This length is usually joined to the rest of the tubing by a glass connexion. If replacement becomes necessary, it can then be made with far greater economy of rubber than if the damage is in other parts of the set, and, at the same time, location of air leaks is simplified.

St. Bartholomew's Hospital, E.C.1. ROBERT J. EVANS.

TREATMENT OF RECENT WAR WOUNDS

SIR,—In a letter in the *Lancet* of July 4, I expressed my opinion that the training of Army surgeons in wound treatment had been and was still inadequate. It was not, of course, my intention to imply that there was no training of this type. I have since been told on very high authority that everything possible is being done in the way of training Army surgeons in wound treatment both in theory and its practical applications at home and abroad.

Oxford. J. C. SCOTT.

CHALK IN BREAD

SIR,—In his letter of Aug. 1 (p. 139) Lord Horder says he supported the calcium-in-bread scheme because of the deficiency of calcium in our war-time diet. In a review of the subject at the Royal Society of Medicine (*Brit. med. J.* June 13, 1942, p. 731) McCance said: "Certain studies of the calcium intake in representative groups of people, adults and children, showed it to be much about the same as before the war." Widdowson and Alington, in their survey of middle-class diets (*Lancet*, 1941, ii, 361), found that the average daily intake of calcium increased from 0·63 g. in 1935 to 0·77 g. in 1941. In a Parliamentary reply (*Ibid*, July 25, 1942, p. 110) we have lately been told that the total sales of milk for liquid consumption in the United Kingdom in 1939, 1940 and 1941 were 863 million, 937 million and 1065 million gallons. Finally, we need only look at the cheese ration even before the present increase to know that Lord Horder's statement is unfounded.

Liverpool. I. HARRIS.

VESTED INTERESTS

SIR,—In connexion with a state medical service it is being stated that the "goodwill" of a medical practice is a vested interest, and by some that this is in the sickness of patients. The latter is obviously ridiculous. The professional ability and the personality of the doctor mainly constitute the goodwill of the practice. These he cannot transfer to any purchaser; they are thus not saleable. What money may have been spent on his education by his parents does not constitute any part of goodwill or vested interest; consequently this has no price. The only vested interests so far as private practice (without NHI) is involved are the money spent on the doctor's house, instruments, &c. These all have a price. Doctors among themselves have instituted a pernicious custom of buying and selling practices and thus supporting medical agencies, but that is purely a matter for themselves and not one they have any right to ask the public to pay for. When we come to the National Health Insurance practices there is a different factor. The Government have definitely in their regulations recognised the transfer and sale of "panel" practices, and where doctors have had to pay for such portions of their practice they have a right to compensation if they do not continue in such practice because of Government action.

W. A. G.

PRACTITIONER AND PATHOLOGIST

SIR,—The application of laboratory methods to clinical medicine—in other words the practice of clinical pathology—demands, as you point out in your leading article of Aug. 15, the combination of a sound knowledge of laboratory technique and clinical medicine. From this it follows that clinical pathology can only properly be practised by those in close and continuing touch with clinical medicine, in laboratories forming an integral part of active hospitals. Divorce of this work from hospitals and its centralisation in laboratories, whether publicly or privately owned, must inevitably result in the perpetuation of just those errors and abuses which you deplore. It is disappointing to gain the impression that you are unaware of the great development of clinical pathology in many provincial hospitals in the past twenty years. Actually there are now few parts of England where the services of a properly staffed department of clinical pathology are not made available through the principal hospitals of the area. In most of these the facilities which you demand for consultation between practitioner and clinical pathologist are provided. That the same cannot be said of Scotland is due to that centralisation of this class of work which you seem to approve.

Clinical pathological services would be even more generally available throughout England if medical students in the past had been encouraged to interest themselves in this special branch of medicine. Sojourn in the pathological laboratories of a hospital, no matter how well equipped, will not by itself make a clinical pathologist. Clinical pathology is something more than "hospital pathology": it demands a training which will make the clinical pathologist as much at home at the bedside as at the laboratory bench.

Wolverhampton. S. C. DYKE.

BABEL IN ENDOCRINOLOGY

SIR,—There has recently been introduced into clinical medicine a substance which has a progestational action when taken by mouth. It is chemically known as anhydrohydroxyprogesterone, pregneninolone, or ethinyltestosterone. It is sold by various manufacturers as 'Lutocyclin Oral,' 'Progestoral,' 'Lutogyl,' 'Proluton C,' and, for all I know, under another half-dozen names. Now the GMC has decided that it should be called ethisterone, thus making confusion worse confounded. There was no need of a new name, still less of a name which draws attention to the chemical relationship of the substance to testosterone (which is of no practical importance) instead of to progesterone (which is). Why should not the "approved name" be anhydrohydroxyprogesterone?

If these new and often very useful remedies are to come into general use, something must be done about nomenclature. Œstradiol benzoate has at least a dozen trade names. Insulin has only one. The first reliable manufacturer to market his products as œstrone (Smith), progesterone (Smith) and so on through the whole range of hormones will receive the unswerving support of this clinic, and, I think, of the whole profession. Meanwhile, would the GMC think again, please?

Endocrine Clinic, Westminster Hospital. RAYMOND GREENE.

IN Dr. Paramore's letter of Aug. 8 (p. 171) read: "When renal failure has developed, the best posture is the semi-prone with the feet somewhat raised."

Obituary

RONALD STEWART

M B EDIN ; SURGEON LIEUTENANT R N V R

THE parents of Surgeon Lieutenant Ronald Stewart, who lost his life on active service last December, have been informed that their son has been mentioned in despatches for his devotion to duty as one of a rescue party sent to the help of a bombed ship, when he worked for many hours to relieve the sufferings of the survivors and did much to aid their recovery. Stewart was educated at Edinburgh Academy and Edinburgh University where he graduated in 1940 when he was still only 21. After a few locums he was appointed house-surgeon at Leith Hospital, but he had already volunteered for the RNVR and in April, 1941, received his commission ; in due course he was appointed to HMS *Audacity*. Ronald Stewart was a farmer's son. He loved the countryside, its people and its sports. He could cast a pretty fly and was something of an expert on the bird-life of Midlothian, having made several expeditions to the Isle of May to study the migrations. His happy personality charmed all who met him, and his sincerity, kindness and wit won him many friends.

A. Hutcheson & Son, Colinton

WILLIAM ELLIOT YOUNG

B M OXFD ; CAPTAIN R A M C

Captain W. E. Young, only son of Sir Alban Young, was killed in action in Libya in May. William Elliot Young, who was born in 1910, was educated at Marlborough and Balliol College, Oxford. He went on to Guy's for his clinical years and qualified LMSSA in 1937, taking his degree the following year. While a resident at Guy's he met Miss Mary Macdonald, daughter of the Rev. J. Macdonald, who was a nurse at the hospital. They were married at the outbreak of war and Dr. Young immediately volunteered for the RAMC. He was called up a few months later and in January, 1940, sailed for India. He accompanied the Indian division to Eritrea the same year and at the end of that campaign was sent to Libya. His widow is still in India with their one son.

Lieut.-Colonel AILWYN HERBERT CLARKE, RAMC, died on June 23 in a prisoner-of-war camp in Italy at the age of 59. At the beginning of the last war he served in France as a Red Cross dresser but eventually returned to finish his medical studies at St. Thomas's. As soon as he qualified MRCS in 1916 he took a commission in the RAMC and went back to France in October. He was awarded the MC for conspicuous gallantry and devotion to duty on Oct. 10, 1918, when under heavy shelling he proceeded several times to the sunken road south-east of Rambourlieux Farm near Le Cateau to attend to wounded. He did not desist until he had succeeded in dressing all his patients and in getting them carried safely away. During the present war Clarke served in the Middle East from June, 1940, till he was captured in April of the next year. He held the temporary rank of lieut.-colonel.

DR. DAWTREY DREWITT.—Sir Walter Langdon-Brown writes : Sir William Hale-White's beautiful little tribute reminds one of another trait in Dr. Drewitt's delightful character—the blend of old-fashioned courtesy with a youthful eagerness to know of any new thing. Some of us used to tell him that as he was born in leap year on Feb. 29 he only aged one year in every four. At 92 he was still a welcome and interested participant at his dining clubs. With his many interests it must have grieved him to say, as he did in his last letter to me on May 16, "I know nothing of the world beyond my bedroom."

Public Health

Iceland

FROM an English summary of the 1939 public-health report of Iceland we learn that the population of that island was 120,264 ; its birth-rate 19·4 ; death-rate 9·7, a low record ; infantile mortality 37·3 (in 1938 it was 28·3, a low record) ; maternal mortality 2·1 ; and that 87·8% of the babies are fully breast-fed. The disease statistics given for the ten years 1930-39 include many conditions for which morbidity returns are rarely available. Thus, in the ten years there were 51,764 notifications of tonsillitis, but only 4 deaths are attributed to this cause ; the attack-rate works out at about 1 person in 20 per annum, or one attack per 20 years of life. Of respiratory catarrh there were 115,731 notifications with 22 deaths ; this works out at one attack per 10 persons per annum Of influenza 55,165 notifications are recorded but only 190 deaths. The annual variation of numbers in tonsillitis was between 3909 and 6713 ; in respiratory catarrh between 8549 and 16,938 ; in influenza between 212 and 21,977. How far the figures are reliable one cannot say. The disease which shows the greatest epidemic periodicity is whooping-cough, of which 8267 cases were notified in 1935 and only 375 in the other nine years. In Britain and the United States whooping-cough shows the least periodic variation of the endemic infections. Hydatid disease occurs in Iceland (102 cases with 54 deaths in 10 years). There were 35 known cases of leprosy in 1930, but the number had fallen to 21 by 1939. Gonorrhœa gives about 500 new cases a year ; syphilis an average of 24 only. Chicken-pox and herpes zoster are both notifiable in Iceland. In view of the undoubted relationship of these two virus diseases, it is interesting that their incidences show no tangible correspondence. In the death table, old age stands first with 15% of all deaths, cancer second with 14%, then pneumonia, heart disease and apoplexy with rather more than 10% each, and then tuberculosis with 8%.

Infectious Disease in England and Wales

WEEK ENDED AUG. 8

Notifications.—The following cases of infectious disease were notified during the week : smallpox, 0 ; scarlet fever, 1340 ; whooping-cough, 953 ; diphtheria, 580 ; paratyphoid, 15 ; typhoid, 6 ; measles (excluding rubella), 5669 ; pneumonia (primary or influenzal), 413 ; puerperal pyrexia, 142 ; cerebrospinal fever, 77 ; poliomyelitis, 10 ; polio-encephalitis, 4 ; encephalitis lethargica, 4 ; dysentery, 82 ; ophthalmia neonatorum, 81. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Aug. 5 was 1542, including scarlet fever, 265 ; diphtheria, 155 ; measles, 384 ; whooping-cough, 233 ; enteritis, 65 ; chicken-pox, 108 ; erysipelas, 40 ; mumps, 60 ; poliomyelitis, 1 ; dysentery, 23 ; cerebrospinal fever, 8 ; puerperal sepsis, 16 ; enteric fevers, 4 ; german measles, 4 ; other diseases (non-infectious), 95 ; not yet diagnosed, 101.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 from an enteric fever, 8 (0) from measles, 2 (1) from whooping-cough, 11 (1) from diphtheria, 34 (3) from diarrhœa and enteritis under two years, and 10 (0) from influenza. The figures in parentheses are those for London itself.

Stockport reported the fatal case of enteric fever. Birmingham had 4 deaths from diarrhœa, and Liverpool 3 from measles.

The number of stillbirths notified during the week was 206 (corresponding to a rate of 35 per thousand total births), including 14 in London.

THE Ministry of Health memo on scabies and how to deal with it has been revised and extended (H.M. Stationery Office, pp. 4, 1*d*.). It now includes a description of the life history and habits of the acarus, a clear account of the symptoms and differential diagnosis (by Dr. A. M. H. Gray) and fuller advice on treatment. Benzyl benzoate is still favoured, but where the patient must do his own application the memo advises sulphur ointment in two-thirds BP strength.

Notes and News

ANCHORING HOSPITAL PERSONNEL

THERE is reason to think that if B1 medical officers in hospitals are allowed to transfer freely from one hospital to another some hospitals will go short of staff. B posts, it will be recalled,[1] are whole-time posts, not always resident, for which previous experience is essential; they are subdivided into B1 and B2 posts. B1 posts include the RSO, RMO, registrar and others of equivalent rank at voluntary hospitals, and appointments with a tenure of more than one year and carrying a salary of more than £350 at a municipal hospital; all the remaining B posts are B2. Hitherto B1 posts have been filled from among those holding B2 posts, but now that men fit for military service holding B2 posts are to be recruited for service with the Forces at the end of their six months of office (Ministry of Health circular 2660), vacant B1 posts will have to be filled by women, men who are physically unfit for the Services or foreign doctors; the supply is thus limited. At the suggestion of the Central Medical War Committee the Minister of Health has agreed that the movement of holders of B1 posts should be controlled, and has decided to use his powers under Defence Regulation 58A. Thus if the holder of a B1 post wants to leave his hospital (except to transfer to another hospital under the same authority) and his hospital thinks it essential to retain him, the senior regional officer must be informed of all the circumstances, or, in the case of the London sector hospitals, the information must be sent to the headquarters of the ministry. The doctor's position will then be investigated, in consultation with representatives of the CMWC, from the points of view of the two hospitals affected; and unless the proposed transfer is one which the minister thinks should be reasonably allowed the doctor will be directed to stay where he is. The minister feels confident that, knowing the difficulties in which hospitals are placed by the withdrawal of personnel for the Forces, doctors will make the best of this temporary restriction of movement. The arrangements will come into force in November.

PSYCHOTHERAPY IN GERMANY

SOME therapeutic trends in Central-European medicine are reflected in a postgraduate lecture by J. E. Staehelin.[2] He is less enthusiastic than most English and American psychiatrists about convulsion therapy in depressions and involutional melancholia, and advises caution because of the dangers of fractures and circulatory and cerebral damage. He is definitely opposed to the use of convulsion therapy in the outpatient department or consulting-room, and he has seen plenty of relapses after temporarily successful treatment. He advocates insulin treatment without the production of deep coma, continued over a long period, and also favours intensive treatment with sex hormones and several other methods such as treatment with acetylcholine, or tincture of opium. Amphetamine and related "waking-up" compounds are recommended for simple retarded depressions with apathy as the main symptom and prevailing vagotonia, but are contra-indicated, he considers, in all agitated and restless cases. Treatment with amphetamine should be interrupted for a few days after a week or two, to avoid the danger of addiction and the insomnia which this drug produces when taken in excess. In discussing epilepsy he enumerates the factors which favour the onset of convulsions, among which is reduced oxygenation of the brain which may result during sleep, especially when the pillows are too soft and the room ill-ventilated, or when the patient has cardiac or pulmonary disease. Shifting of the acid-base equilibrium towards alkalosis may also favour the onset of fits, and to promote acidosis he advises periodic fasting, pyrotherapy and a ketogenic diet; since hyperventilation favours alkalosis he discourages patients from taking excessive physical exercise. A high blood-chloride is also to be avoided, and he recommends that a diet poor in salt should be tried first in all mild cases. A low blood-sugar, especially in the morning, may provoke convulsions, and he believes in careful regulation of the carbohydrate intake so as to avoid this. Water retention, associated with a high chloride content of the body and excess of posterior pituitary hormone, should be counteracted by a diet poor in fluids and by boric acid preparations which help to dehydrate the brain and favour acidosis. He advises the relief of increased intracranial pressure—for example, in status epilepticus—by lumbar puncture. For the hyperexcitability of the central nervous system he suggests the usual sedative drugs: bromides, and phenobarbitone and other barbiturates. Disturbances of the vegetative nervous system are improved, he finds, by atropine. Failing circulation and a tendency to vascular spasms he treats with cardiac stimulants such as caffeine and nikethamide, and he advises thyroidectomy in suitable cases.

1. See *Lancet*, 1940, i, 1104. 2. *Schweiz. med. Wschr.* 1942, **72**, 505.

THE ILLICIT USE OF NARCOTIC DRUGS

THE justice of the warning, issued by the Advisory Committee of the League of Nations on Dangerous Drugs, against any relaxations during war conditions is borne out by the statistics of seizures of illicit traffic in 1939. Thus in Burma in that year 5644 kg. of opium (raw and prepared) were seized, in Turkey 2291 kg. of raw opium, in Egypt 1110 kg. of opium, 24 kg. of heroin and 723 kg. of hashish. In the United States, where the manufacture of heroin is forbidden, 86 kg. was confiscated, and no less than 22,623 kg. of Indian hemp including marihuana (the dried flowering tops of the cannabis plant) were seized in 1939. Japan has never been very zealous in carrying out the various opium conventions to which she is a party and in the parts of China which she has over-run there seems to have been encouragement rather than repression of the abuse of habit-forming narcotics. The advance made in the Far East, under international conventions since 1912, in restricting to medical and legitimate purposes opium, prepared opium, morphine, heroin and cocaine and their preparations appears to have been checked and reversed with the physical and moral results attending such reaction.

PULMONARY EMBOLISM AFTER VARICOSE-VEIN INJECTION

A FATAL case of pulmonary embolism has prompted A. M. Vaughn and W. M. Leis (*J. Amer. med. Ass.* 1942, **118**, 1293) to draw attention to the danger of injecting varicose veins in patients who are not ambulatory during treatment. They also emphasise the known fact that thrombophlebitis increases the chance of embolus formation. Their patient was a woman of 65, active and well except for ulceration of a patch of skin on the anterior surface of the left leg at the junction of its middle and lower thirds. In the patellar and popliteal regions there was reddish-blue discoloration of the skin, which was, however, unbroken. The veins of the leg were enlarged and tortuous. There seems to have been no suspicion of phlebitis. On March 28, 2 c.cm. of 5% sodium morrhuate was injected into a varicose vein just proximal to the ulcer. Evidently there was no improvement from this one injection, and the patient was admitted to hospital on April 14. From this time until her death on April 28 she was kept in bed. Hot fomentations and a heat cradle were applied to the leg, and four injections of 1·5 c.cm. of 5% sodium morrhuate were given between April 16 and 20. After the last injection the ulcer was healing rapidly. The woman died suddenly on April 28, and autopsy showed that both main pulmonary arteries and their first division were occluded by coiled emboli. The left common iliac vein was distended with blood; its tributaries deeper in the leg were occluded by antemortem clots. There was generalised arteriosclerosis, especially of the abdominal aorta and the coronary arteries. Vaughn and Leis believe that the enforced rest and immobility of the patient were the main factors in promoting the thrombophlebitis, and that it is wrong to stop the daily routine activities of a patient during injection treatment of varicose veins. Their view is supported by an analysis of 44 published cases of fatal pulmonary embolism following this treatment. Incidentally, the analysis shows that no one solution is particularly blameworthy. Fatalities have occurred after injection of a great variety of substances, including sodium morrhuate, quinine and urethane, sodium chloride, dextrose and invertose.

Medical Honours

The following awards have recently been made:

GM.—The late Surgeon Lieut.-Commander R. M. Bremner, MB EDIN, RN.

MC.—Captain R. E. S. Lewis, MB EDIN, RAMC; Captain C. D. Weir, MB EDIN, RAMC; Captain A. G. J. P. Fernandes, MB, IMS; and Lieutenant D. J. Burnett, IMS.

RNVR Officers Decoration.—Surgeon Commander W. H. Butcher, DM OXFD; Surgeon Commander J. B. Oldham, FRCS; and Surgeon Commander H. M. Petty, MB LEEDS.

Foreign Awards—Norwegian Military Cross with Sword.—Lieut.-Colonel (A/Colonel) A. J. Beveridge, MC, MB NUI, RAMC; and Captain W. M. Burgess, MB, RAMC. *Greek War Cross (third class)*: Surgeon Lieut.-Commander J. C. Moor, MD DURH, RNVR.

Medical Casualties

The following casualties have been announced:

Died.—Lieut.-Colonel Homi Rustomji Cursetji, MB BOMBAY, DOMS, IMS.

Missing.—T/Surgeon Lieutenant A. P. Curtin, MRCS, RNVR.

Previously missing, now officially reported P of W.—Major I. A. B. Cathie, MD LOND, RAMC.

P of W.—Captain E. F. M. Caraher, MB NUI, RAMC; Captain A. F. Murray, MB ABERD, RAMC; Major J. M. Officer, MB EDIN., RAMC; Lieutenant A. C. Price, MRCS, RAMC; Major L. F. Richmond MB DURH, RAMC; WS/Captain R. L. Sanderson, MB EDIN, RAMC; and WS/Captain D. B. Watson, MB, RAMC.

Wounded.—A/Colonel D. V. O'Malley, OBE, MB NUI, IMS.

Irish Dietetic Council

The first annual report of the Dietetic Council, appointed last autumn by the Medical Association of Eire, is a record of useful work under the chairmanship of Dr. P. T. O'Farrell, with Prof. W. J. E. Jessop as hon. secretary. The council has induced the St. John Ambulance Brigade, the Irish Red Cross Society, the Order of Malta Ambulance Corps, and the School of Domestic Science to hold classes in dietetics. Several papers on dietetic subjects have been published in the *Journal of the Irish Medical Association*, and the council has been in constant touch with Government departments on questions of food-supplies and of health.

India's War-time Medical Services

Unlike other arms of the defence services, field units of the Indian medical services do not exist in peace-time, but since the beginning of the war over 300 have been raised and are now serving in the United Kingdom, Middle East, East and West Africa, Palestine, Iraq, Iran, Ceylon, the Seychelles and in India itself. Ambulance trains have also been provided for railways in the Eastern theatres of war and hospital ships were used for the evacuation of casualties from Iraq, Iran, Burma, Assam and Eastern Bengal. To meet these demands many new training schools have been started and the old ones rapidly expanded. A centrally controlled Army medical store organisation has also been created which, in addition to the normal calls on its resources, has helped the American, Chinese and Russian armies.

Training School for Mental Nurses

London needs 700 mental nurses and to encourage the flow of recruits the LCC have set up a training school at Claybury Hospital which will give new entrants a gradual introduction to their work. The school is intended to act as a feeder to the council's mental hospitals to the north of the Thames—Claybury, Friern, Leavesden and St. Bernard's—and if it is a success the council will consider setting up schools at other hospitals. The school accommodates twenty nurses at a time. Each has her own bedroom, is provided with uniform and receives the pay of a probationer. The four-week course includes a good deal of individual tuition, lectures and demonstrations in elementary nursing, and visits to wards, kitchens, laundries and laboratories.

PREMAXILLARY CYSTS.—Dr. H. T. Roper-Hall, of 43a, Calthorpe Road, Five Ways, Birmingham, 15, asks for details, models, radiograms, specimens or histories of cysts in the premaxillary region, especially those in the region of the lateral tooth, in which diagnosis was complicated or origin uncertain, and the teeth not apparently involved.

Major JOHN GILMOUR, FRCSE, RAMC retd., an officer of the Department of Health for Scotland, has been appointed a temporary inspector under the Cruelty to Animals Act 1876.

A PRIVATE investigation quoted by Dr. Gustaf Alegård in *Fackföreningsrörelsen* showed that in Stockholm the infant mortality per 1000 live births was 14·3 where the father's income was over 10,000 kronor (£600) a year, and 48·9 where his income was less than that. The rate for the whole country for 1940 was 38·6; in a prosperous farming district in southern Sweden it was 32 and it rose to 67 in the sparsely settled extreme north.

Births, Marriages and Deaths

BIRTHS

ANDERSON.—On Aug. 6, in London, the wife of Major Ian McAllister Anderson, RAMC—a daughter.

BARRY.—On Aug. 8, at Dublin, the wife of Surgeon Commander T. L. Barry, RN—a son.

BROMLEY.—On Aug. 12, at Bury St. Edmunds, the wife of Dr. J. W. Bromley—a son.

CRESSALL.—On Aug. 11, at Oxford, the wife of Captain S. F. M. Cressall, RAMC—a son.

EXNER.—On Aug. 11, at Winchester, the wife of Dr. G. G. Exner, of Harley Street, W.1—a daughter.

HANCOCK.—On Aug. 12, at Aylesbury, the wife of Dr. F. R. Thompson Hancock, of Stoke Mandeville—a son.

HENSON.—On Aug. 13, at Bath, the wife of Captain Ronald A. Henson, RAMC— a daughter.

KENNERLEY.—On Aug. 10, at Harborne, the wife of T/Major T. A. S. Kennerley, RAMC—a son.

LEWIS.—On Aug. 11, at Woking, the wife of Surgeon Lieut.-Commander B. S. Lewis, RN—a son.

RIGBY-JONES.—On July 31, in London, Dr. Peggy Rigby-Jones (née Permain), the wife of Lieutenant Guy Rigby-Jones, RAMC —a son.

ROBERTSON.—On Aug. 12, at Evesham, the wife of Dr. J. M. Robertson—a son.

MARRIAGES

ADLINGTON—LAYLAND.—On Aug. 10, at Torquay, John Adlington, MB, surgeon lieutenant RNVR, to Nora Frances Layland, WRNS.

PIGGOTT—POWLESLAND.—On Aug. 8, at Newton Abbot, F. Stanley L. Piggott, MRCS, of Teignmouth, to Nancy Powlesland.

SPENCE—PIKE.—On Aug. 10, at Oxford, James Henderson Spence, MB, to Edith Pike.

DEATHS

ASHE.—On Aug. 7, at Ombersley, Worcs., Henry Park Ashe, MRCS.

HENDRY.—On Aug. 13, at Rugby, Robert Applegarth Hendry, MD LOND, MB LPOOL, formerly of Liverpool.

INSTONE.—On Aug. 14, Noel Instone, MB LOND, at Addison Road, W.14.

WALKER.—On July 24, William Walker, MC, MD ABERD, major RAMC retd., pathologist to the Tynemouth Victoria Infirmary, aged 51.

Sir HAROLD SCOTT will retire at the end of August from the post of director of the Bureau of Hygiene and Tropical Diseases which he has held since 1935. The Secretary of State for the Colonies has appointed Dr. Charles Wilcocks, the present assistant director of the bureau, to be acting director.

Mr. BOWDLER HENRY, MRCS, LDS, has been appointed honorary consulting oral surgeon and consultant adviser to the Royal Netherland Army, the Fighting French Forces, the medical section of the Czechoslovak Red Cross, the central committee of the Polish Red Cross, and the Royal Norwegian Ministry of Social Welfare.

ALVARENGA PRIZE.—The College of Physicians of Philadelphia have awarded this prize for 1942 to Dr. Edwin J. Cohn, professor of physiological chemistry at Harvard University, in recognition of his contribution to our knowledge of blood proteins.

The AMERICAN RED CROSS HARVARD FIELD HOSPITAL UNIT which was established in England two years ago has now been taken over by the United States Army. It is to be used as the central medical laboratory for the American forces in this country.

Messrs. MAY and BAKER have issued their 'Stovarsol Vaginal Compound' (S.V.C.) tablets for the treatment of trichomonas infection in a new shape—rectangular with rounded corners—and with a new excipient. It is claimed that these changes will ensure greater ease of insertion, more regular disintegration and less tendency to breakage, and will promote an acid reaction in the vagina.

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ON page 190 of Aug. 15 we said there is only one chair of pædiatrics in England; there are in fact two—at Birmingham (Prof. L. G. Parsons) and at Leeds (Prof. C. W. Vining).

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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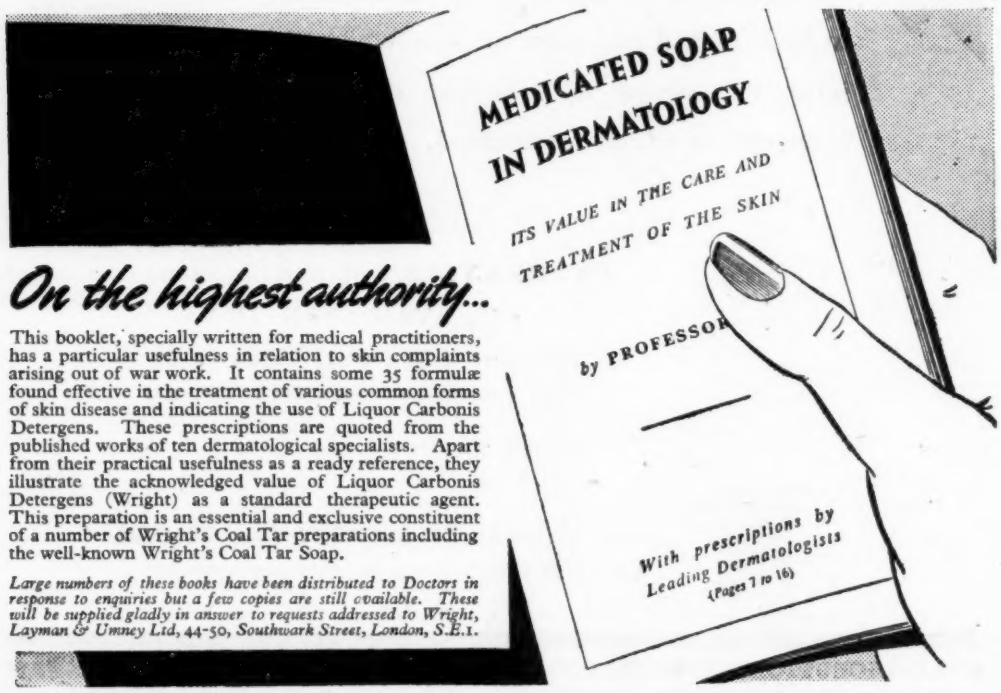

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This booklet, specially written for medical practitioners, has a particular usefulness in relation to skin complaints arising out of war work. It contains some 35 formulæ found effective in the treatment of various common forms of skin disease and indicating the use of Liquor Carbonis Detergens. These prescriptions are quoted from the published works of ten dermatological specialists. Apart from their practical usefulness as a ready reference, they illustrate the acknowledged value of Liquor Carbonis Detergens (Wright) as a standard therapeutic agent. This preparation is an essential and exclusive constituent of a number of Wright's Coal Tar preparations including the well-known Wright's Coal Tar Soap.

Large numbers of these books have been distributed to Doctors in response to enquiries but a few copies are still available. These will be supplied gladly in answer to requests addressed to Wright, Layman & Umney Ltd, 44-50, Southwark Street, London, S.E.1.

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THE LONDON HOSPITAL MEDICAL COLLEGE AND DENTAL SCHOOL

(UNIVERSITY OF LONDON.)

THE SESSION WILL OPEN ON THURSDAY, OCTOBER 1st.

The London Hospital has escaped serious damage from air-raids and remains the Headquarters of the Medical School and the main centre for lectures and clinical teaching for senior students. The number of beds has been reduced to 350, but the Out-patient Department is working normally. The Hospital has opened an Annexe at Brentwood with 360 beds as the main teaching centre for junior clinical students. The Departments of Anatomy and Physiology and Queen Mary College, with the Departments of Chemistry, Physics, and Biology, have been temporarily transferred to Cambridge.

Students beginning the clinical course spend the first clinical year at the Annexe at Brentwood under the Honorary Staff of the London Hospital. After a year of clinical experience in the wards they move to the laboratories of Chase Farm Hospital at Enfield for a course in Pathology, given by the Pathologists to the London Hospital. During this course, students are taken to Claybury Mental Hospital for a course in Mental Diseases and to the Eastern Fever Hospital for a course in the Acute Fevers. After the course in Pathology, students are sent for six months to gain experience as Student House Officers (free board and lodging and a salary of £50 a year) or as E.M.S. Dressers (free board and lodging) at Sector Hospitals. During the third clinical year, all students return to the London Hospital for clinical work in the wards and Out-patient Departments and for systematic lectures in preparation for the Final Examinations. Twelve students live in the London Hospital free of charge as Emergency Dressers. Others can live at home or at the nearby County Council Hospitals (many as E.M.S. Dressers) and come to the Hospital every day.

The experience to be gained at the London Hospital under war conditions is greater and more varied than it was before the war. Students now have the advantage of seeing many aspects of the hospital work of the country and opportunity for practical clinical work as Student House Officers and Dressers at Sector Hospitals.

Entries for scholarships and applications for admission should be sent to the Dean, Dr. A. E. Clark-Kennedy, M.D., F.R.C.P., Physician to the Hospital and Fellow of Corpus Christi College, Cambridge, who can be seen by appointment either at the Hospital, or in his rooms in Corpus Christi College, Cambridge, on Sunday evenings during term at 9 P.M.

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BRITISH POSTGRADUATE MEDICAL SCHOOL.

(UNIVERSITY OF LONDON)

WAR MEDICINE COURSE
7th to 11th September, 1942

Monday 7th Sept.	10 A.M.	Skin Diseases in War ..	Dr. R. T. Brain, M.D., F.R.C.P.
	11.30 A.M.	The Prevention in Barracks and the Field of Certain Wartime Diseases of Special Military Importance.	Colonel N. H. Brown, R.C.A.M.C.
	1.30 P.M.	The Prevention in Barracks and the Field of Certain Wartime Diseases of Special Military Importance (contd.).	Colonel N. H. Brown, R.C.A.M.C.
	3 P.M.	Prescribing in Wartime ..	Dr. P. Hamill, F.R.C.P.
Tuesday, 8th Sept.	10 A.M.	War Neuroses	Brigadier J. R. Rees, M.D., M.R.C.P.
	11.30 A.M.	War Neuroses (contd.) ..	Brigadier J. R. Rees, M.D., M.R.C.P.
	1.30 P.M.	Treatment of Gas Casualties.	Professor J. Nixon, C.M.G., M.D., F.R.C.P.
	3 P.M.	Effects of Blast	Mr. S. Zuckerman, M.A., D.Sc.
Wednesday, 9th Sept.	10 A.M.	T.N.T. Poisoning and War Hazards in Industry.	Dr. Donald Hunter, M.D., F.R.C.P.
	11.30 A.M.	The Pathology of War Gas Poisoning.	Prof. G. R. Cameron, D.Sc., F.R.C.P.
	1.30 P.M.	Dietetic Problems	Professor Drummond.
	3 P.M.	Infectious Jaundice ..	Lieut.-Colonel Gordon, M.C., Ph.D., M.D.
Thursday, 10th Sept.	10 A.M.	Effort Syndrome	Major P. Wood, M.D., F.R.C.P.
	11.30 A.M.	Food Poisoning	Sir Wm. Savage, M.D., L.R.C.P.
	1.30 P.M.	Epidemiology of Paratyphoid Fever.	Sir Wm. Savage, M.D., L.R.C.P.
	3 P.M.	Medical Aspects of Head Injuries.	Major W. R. Russell, M.D., F.R.C.P.
Friday, 11th Sept.	10 A.M.	Crush Injuries	Dr. E. G. Bywaters, M.R.C.P.
	11.30 A.M.	Sulphonamide Drugs in War.	Col. L. E. H. Whitby, C.V.O., M.D., F.R.C.P.
	1.30 P.M.	Salt and Water	Dr. McCance, M.D., F.R.C.P.
	2.30 P.M.	Practical Management of Shock.	Dr. J. McMichael, M.D., F.R.C.P., F.R.S.E.
	3.30 P.M.	Dyspepsia in War.. ..	Dr. C. E. Newman, M.D., F.R.C.P.

The fee for the Course will be one guinea, but no fee will be charged in the case of Officers of the Armed Forces who are nominated for the course by their respective Director-Generals. Applications for admission should be addressed to the DEAN, British Postgraduate Medical School, Ducane-road, W.12.

Further War Courses will commence as follows:—

WAR SURGERY OF THE EXTREMITIES .. MONDAY, 21ST SEPTEMBER.
SURGICAL CARE OF THE SOLDIER IN TRAINING .. .. MONDAY, 5TH OCTOBER.
WAR SURGERY OF THE ABDOMEN .. MONDAY, 19TH OCTOBER.

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Notice is hereby given that the following Examinations will commence on the dates stated below :—

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(Chemistry, Physics, and Biology)
MONDAY, 14TH SEPTEMBER.

FIRST EXAMINATION
(Anatomy, Physiology, and Pharmacology)
MONDAY, 21ST SEPTEMBER.

FINAL EXAMINATION
(Pathology, Medicine, Surgery, and Midwifery)
WEDNESDAY, 30TH SEPTEMBER.

Candidates who have fulfilled the necessary conditions, and who desire to present themselves for Examination, must give notice in writing to the Secretary, Examination Hall, 8–11, Queen-square, London, W.C.1, at least twenty-one days before the date of the Examination, transmitting at the same time such certificates as may be required by the Regulations of the Board, together with the full amount of the fee due for the subject or subjects for which they desire to enter.

HORACE H. REW, Secretary.

Royal College of Physicians of London.

The next ordinary PROFESSIONAL EXAMINATION for the MEMBERSHIP will commence on WEDNESDAY, 7TH OCTOBER, 1942.

Candidates are required to give twenty-one days' notice in writing to the Registrar of the College, to whom all certificates and testimonials required by the Bye-laws must be sent at the same time.

Candidates who propose to submit published work under the regulations now in force are required to give twenty-eight days' notice, and should apply in writing to the Registrar, without delay, for detailed instructions as to the procedure they should follow.

H. E. A. BOLDERO, D.M., Registrar.

Pall Mall East, S.W.1.

BRITISH POSTGRADUATE MEDICAL SCHOOL

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Consisting of Seven Sessions.

The course will commence on the 24TH AUGUST, 1942, at 2.30 P.M., and be held every afternoon during the week. On Friday there will be an additional session from 10 A.M. to NOON, and the last session will commence at 10 A.M. on Saturday, 29th August, 1942.

The course is strictly limited to 20 students and is intended for officers. Applications for admission should be made to the DEAN, British Postgraduate Medical School, Ducane-road, W.12.

The fee for the course will be five guineas, but no fee will be charged in the case of officers of the Armed Forces who are nominated for the course by their respective Director-Generals.

L. M. S. S. A.

FINAL EXAMINATION: SURGERY, October 12th, November 9th, December 7th, 1942; MEDICINE, October 19th, November 16th, December 14th, 1942; MIDWIFERY, October 20th, November 17th, December 15th, 1942.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

Royal College of Surgeons of England.

LICENCE IN DENTAL SURGERY.

Notice is hereby given that the following Examinations will commence on the dates stated below :—

FIRST PROFESSIONAL EXAMINATION
MONDAY, 21ST SEPTEMBER.

SECOND PROFESSIONAL EXAMINATION
TUESDAY, 22ND SEPTEMBER.

Candidates who have fulfilled the necessary conditions, and who desire to present themselves for Examination, must give notice in writing to the Director of Examinations, Examination Hall, 8–11, Queen-square, London, W.C.1, at least twenty-one days before the date of the Examination, transmitting at the same time such certificates as may be required by the Regulations of the Board, together with the full amount of the fee for the Part or Parts of the Examination for which they desire to enter.

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Recreational Therapies are held daily by skilled Leaders

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FOR NERVOUS AND MENTAL DISORDERS

Cases of Alcoholism and Drug Addiction are admitted. Every facility for individual treatment on the most modern lines. **Special Department for Insulin Therapy.** Fully equipped Gymnasium, Golf Course, and Indoor Swimming Pool. Specially trained Occupational and Recreational Therapists.

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Near DARTFORD, KENT.

Ladies and Gentlemen received for treatment under certificates, and without certificates as either VOLUNTARY or TEMPORARY PATIENTS, at a weekly fee of £2 9s., and upwards.

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British Postgraduate Medical School.

(UNIVERSITY OF LONDON.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), to become vacant on the 1st October, 1942, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41. The appointment will be for a period of six months. Salary is at the rate of £105 per annum, with full residential emoluments.

Applications should be addressed to the DEAN, British Postgraduate Medical School, Ducane-road, Shepherd's Bush, W.12, together with copies of three recent testimonials, not later than Tuesday, 1st September, 1942.

West London Hospital,

Hammersmith, W.6.

APPOINTMENT OF RESIDENT ANÆSTHETIST AND E.N.T. AND OPHTHALMIC HOUSE SURGEON (B2).

Applications are invited from registered medical practitioners, Male and Female, for the above appointment to become vacant on 1st October. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment is limited to six months, terminable by one month's notice on either side. Salary according to experience but not less than at the rate of £100 per annum, with the usual residential emoluments.

Applications, stating age, qualifications with dates, nationality, experience, and present post, should be accompanied by copies of three recent testimonials and sent not later than 7th September to: H. A. MADGE, Secretary.

Westminster Hospital,

St. John's-gardens, S.W.1.

ACTING ASSISTANT SURGICAL REGISTRAR (B1).

Applications are invited from registered medical practitioners, Male and Female, for the above appointment. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary £250 per annum, with board-residence.

Applications and copies of two recent testimonials should be addressed immediately to—

CHARLES M. POWER, House Governor and Secretary.

National Hospital, Queen-square, W.C.1.

(For the Relief and Cure of Diseases of the Nervous System, including Paralysis and Epilepsy.)

Applications are invited from registered British medical practitioners for the appointment of RESIDENT MEDICAL OFFICER (B1), to become vacant on 1st September, 1942. Applicants should already have held house appointments. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary is at the rate of £150 per annum.

Applications, stating age, qualifications, and experience, accompanied by copies of three testimonials, should be forwarded on or before 28th August to the SECRETARY.

London Hospital, E.1.

Applications are invited for the post of RADIO-THERAPIST. The successful candidate will be required to organise and take charge of the new department Radio Therapy. Salary £1500 per annum. Private practice to be allowed only in the hospital on an agreed basis.

Applications, together with testimonials, should be sent to the House Governor (from whom further particulars of the appointment may be obtained) and should arrive not later than Tuesday, 8th September.

H. BRIERLEY, House Governor.

The Prince of Wales's General

HOSPITAL, London, N.15.

Applications are invited for the appointment of TEMPORARY HONORARY ASSISTANT SURGEON to the GENITO-URINARY DEPARTMENT. Applicants must be Fellows of the Royal College of Surgeons of England, and must be engaged in consulting practice only.

Applications, together with copies of three recent testimonials, should reach the undersigned on or before 9th September, 1942.

J. C. BURDETT, Director and House Governor.

11th August, 1942.

Hospital for Consumption and Diseases

OF THE CHEST, Brompton, S.W.3.

Applications are invited from registered medical practitioners, Male and Female, for the appointments of :—

RESIDENT SURGICAL OFFICER (B1). Applicants must have held a resident hospital appointment. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. The appointment is for six months commencing on 1st October. Salary at the rate of £150 per annum, with board and residence, and an additional £25 per annum for services in connexion with paying patients.

HOUSE PHYSICIAN (B2). The duties include work in the Out-patient Department as well as in the wards, and the appointment is for six months commencing on 1st November, with an honorarium of £50.

HOUSE PHYSICIAN (B2), at the SANATORIUM at Frimley. The appointment is for six months commencing on 1st November, with an honorarium of £50.

Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of one or more recent testimonials, should reach the undersigned not later than Saturday, 5th September, 1942.

Brompton, August, 1942. F. G. ROUVRAY, Secretary.

Northamptonshire County Council.

Applications are invited from registered medical practitioners holding a diploma in Public Health or similar qualification for the temporary appointment of ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH under the above County Council and DISTRICT MEDICAL OFFICER for the Borough and Rural District of Brackley, the Borough and Rural District of Daventry, and the Brixworth Rural District. The inclusive salary will be at the rate of £800 per annum, plus such cost-of-living bonus as may from time to time be approved, with a travelling allowance on the scale authorised by the County Council. The officer will be required to devote his whole time to the duties of the office and to reside in a place approved by the authorities. The appointment, which will in no case be for a period longer than the duration of the war or such time thereafter as may elapse before the permanent officer returns from Service to duty, will be determinable by three months' notice on either side.

Applications, stating age, qualifications, and experience, together with copies of not more than three recent testimonials, should reach the undersigned not later than the 9th September, 1942. J. ALAN TURNER, Clerk of the County Council.

County Hall, Northampton, 17th August, 1942.

The Liverpool Sanatorium,

FRODSHAM, CHESHIRE. (175 Beds.)

Applications are invited from registered medical practitioners for the appointment of DEPUTY MEDICAL SUPERINTENDENT (B1), to become vacant on 1st October. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. The appointment is tenable for four years. Salary £400 per annum, with annual increments of £25. Married or single quarters available.

Applications, stating age, qualifications, and experience, and accompanied by copies of recent testimonials, should be sent as soon as possible to the MEDICAL SUPERINTENDENT.

HIS MAJESTY'S COLONIAL SERVICE

THE COLONIAL MEDICAL SERVICE

VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.

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Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.

City of Leicester.

CITY GENERAL HOSPITAL, Gwendolen-road.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT MEDICAL OFFICER (B2) for (mainly) medical duties. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply, when appointment is limited to six months; otherwise to twelve months. The salary is at the rate of £300 per annum (plus at the present time a war-time bonus of £16 18s. per annum), with full residential emoluments.

Applications (on forms supplied), accompanied by copies of three recent testimonials, must be submitted as soon as possible endorsed "R.M.O. City General Hospital," and addressed to—

E. K. MACDONALD, Medical Officer of Health.

Health Department, Grey Friars, Leicester, August, 1942.

South Shields General Hospital.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months; otherwise for twelve months. Salary is at the rate of £150 per annum, with full residential emoluments and cost-of-living bonus at present at the rate of £9 per annum.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of two recent testimonials, should be sent to—

W. CAMPBELL LYONS, Medical Officer of Health.

Public Health Department, Stanhope-road, South Shields, 15th August, 1942.

Hull Corporation Health Department.

ANLABY-ROAD HOSPITAL.

TEMPORARY ASSISTANT MEDICAL OFFICERS (B1).

Applications are invited for the above temporary appointments from registered medical practitioners of either sex. Salary £350 per annum, rising by annual increments of £25 to £450 per annum, plus war bonus, together with allowance at the rate of £150 per annum in lieu of board, residence, &c., outside the Hospital. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

Forms of application, &c., may be obtained from, and should be returned duly completed to, the MEDICAL OFFICER OF HEALTH, Guildhall, Hull, not later than 10 A.M. on Monday, the 7th September, 1942.

Winterton Hospital.

Applications are invited from registered medical practitioners (Male and Female) for the appointment of a HOUSE SURGEON (A) AND HOUSE SURGEON (A) to the FRACTURE DEPARTMENT, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months; otherwise for an indefinite period not exceeding one year. Salary is at the rate of £120 per annum, with full residential emoluments.

Apply to the MEDICAL SUPERINTENDENT, WINTERTON HOSPITAL, SEDGEFIELD, STOCKTON-ON-TEES.

Blackburn and East Lancashire

ROYAL INFIRMARY. (248 Beds.)

Applications are invited from registered medical practitioners for the post of HOUSE PHYSICIAN (A), to become vacant on 14th September, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary is at the rate of £175 per annum, with full residential emoluments. The House Physician also has charge of the E.N.T. Wards and attends the fracture clinic.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to—

T. DEWHURST, General Superintendent and Secretary.

County of Warwick.

NUNEATON HOSPITAL.

Applications are invited from registered medical practitioners (Male and Female) for the appointment of HOUSE SURGEON (A) at the above Hospital, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months; otherwise not exceeding 12 months, but for 6 months in first instance. Salary £150 per annum, with full residential emoluments.

Applications on forms to be obtained from the Public Assistance Officer, Shire Hall, Warwick, and on completion to be returned to him together with copies of three recent testimonials. L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick, 14th August, 1942.

City of Birmingham Infectious Disease

HOSPITAL, LITTLE BROMWICH. (750 Beds.)

Applications are invited from registered medical practitioners Male and Female, for the appointment of a JUNIOR MEDICAL OFFICER (A), including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months; otherwise for one year. Salary is at the rate of £300 per annum, plus residential emoluments.

Applications, stating age, qualifications, experience, and nationality, together with copies of three recent testimonials, to be sent to the MEDICAL OFFICER OF HEALTH not later than the 31st August, 1942.

Weston-super-Mare General Hospital.

(150 Beds.)

Applications are invited from medical practitioners (Male) for the appointment of a HOUSE PHYSICIAN (A), including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Duties to commence at an early date. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be addressed to—

LESLIE J. FURSLAND, Secretary.

Royal Hampshire County Hospital,

WINCHESTER.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), to become vacant immediately, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary is at the rate of £170 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, should be sent immediately to—

H. EWART MITCHELL, Superintendent and Secretary.

17th August, 1942.

Grimsby and District Hospital.

Applications are invited from registered medical practitioners, Male and Female, for the following appointments, to become vacant on 30th September, 1942:—

RESIDENT CASUALTY OFFICER AND HOUSE SURGEON (A), including practitioners within three months of qualification and liable under the National Service Acts, 1939–41. Appointment for six months. Salary at the rate of £175 per annum, with full residential emoluments.

RESIDENT ORTHOPÆDIC OFFICER (B2). Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply. Appointment for six months. The salary is at the rate of £275 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, and copies of recent testimonials, to the SECRETARY-SUPERINTENDENT.

13th August, 1942.

City and County of the City of Exeter.

CITY HOSPITAL (PUBLIC ASSISTANCE).

Applications are invited from registered male medical practitioners of over three years' standing in their profession for the post of MEDICAL OFFICER (B1) (temporary) of the above Institution. The hospital has been upgraded, and is included in the Ministry of Health's Medical Scheme. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. The salary will be the rate of £800 per annum, non-resident, and the appointment will be for twelve months in the first instance, and thereafter at three calendar months' written notice on either side. Other things being equal, preference will be given to candidates with sound surgical experience and with experience in a similar appointment. Any fees received must be returned to the City Council. The successful candidate will be required to devote the whole of his time to the duties, and he will be on the staff of the Medical Officer of Health, from whom further particulars may be obtained.

An application form may be obtained from the undersigned, to whom it should be returned, together with copies of two recent testimonials, not later than 26th August, 1942.

C. J. NEWMAN, Town Clerk and Public Assistance Officer.
Exeter, 15th August, 1942.

Royal South Hants and Southampton

HOSPITAL, SOUTHAMPTON. (255 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointments of :—

RESIDENT SURGICAL OFFICER (B1), to become vacant on 7th September, 1942. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary is at the rate of £300 per annum, with full residential emoluments. The appointment will be for a period of twelve months.

HOUSE SURGEON (A), now vacant, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41. The appointment is for a period of six months. Salary is at the rate of £175 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent not later than 31st August, 1942, for Resident Surgical Officer, and immediately for House Surgeon, to—

EDWARD L. WIRGMAN, House Governor.

Royal South Hants and Southampton

HOSPITAL, SOUTHAMPTON. (255 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of CASUALTY OFFICER (B2), now vacant. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply. The appointment will be for a period of six months. The salary is at the rate of £175 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

EDWARD L. WIRGMAN, House Governor.

University of Birmingham.

DEPARTMENT OF ANATOMY.

Applications are invited for the posts of TEMPORARY ASSISTANT LECTURERS IN ANATOMY (two vacancies). Each appointment will be for one year and will date from 28th September, 1942. Stipend £250–£300 per annum, according to experience. The posts are especially suitable for candidates wishing to read for higher degrees.

Applications should be accompanied by the names of two referees and sent by 31st August to: C. G. BURTON, Secretary.

The County Council Hospital,

ST. PAUL'S HILL, WINCHESTER.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months; otherwise for one year. Salary is at the rate of £150 per annum, with full residential emoluments.

Apply to: THE COUNTY MEDICAL OFFICER, The Castle, Winchester.

West Cornwall Hospital, Penzance.

(184 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), to become vacant on the 14th September, 1942, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to—

K. I. NEWELL, Secretary-Superintendent.

County Borough of Halifax.

THE HALIFAX GENERAL HOSPITAL. (400 Beds.)

RESIDENT MEDICAL OFFICER (B1) required for the above Hospital, a busy General Hospital having 6000 admissions in the year and with a staff of six full-time Medical Officers. The duties are almost entirely medical and the successful candidate will be the senior of two medical residents. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

Candidates may be Male or Female, British or alien, and previous medical experience is essential. Salary £350–£25–£400 if resident, plus £150 in lieu of residential emoluments if non-resident, together with war bonus according to scale. In certain circumstances the commencing salary may be greater than the above.

Applications to be forwarded to the MEDICAL SUPERINTENDENT before 2nd September, 1942.

Hull Royal Infirmary.

Applications are invited from registered medical practitioners, Male and Female, for the following appointments at the MAIN and/or SUTTON BRANCH HOSPITALS :—

SENIOR HOUSE SURGEON (B1), vacant August. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary is at the rate of £225 per annum, with full residential emoluments.

HOUSE SURGEON (B2), vacant October. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment is limited to six months. Salary is at the rate of £200 per annum, with full residential emoluments.

Both the above posts are recognised for the F.R.C.S. examinations.

CASUALTY OFFICER (A), vacant November. Applicants may include practitioners within three months of qualification and liable under the National Service Acts, 1939-41, when appointment will be for six months. Salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of recent testimonials, should be addressed to: R. J. CARLESS, House Governor.

The Jessop Hospital for Women,

SHEFFIELD.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (B2), to become vacant on 1st September. Applications from male R practitioners who have been qualified more than three months cannot be considered unless they have been rejected by the R.A.M.C. If held by a practitioner, male or female, who is liable under the National Service Acts, 1939–41, the appointment will be limited to six months. Salary at the rate of £100 per annum, with full residential emoluments.

Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

DAVID OSWALD, Superintendent and Secretary.

Royal Eye and Ear Hospital, Bradford.

(94 Beds.)

HOUSE SURGEON (A) (Male or Female) wanted for 1st October. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may apply when appointment will be for six months. Salary £180 per annum, with board, residence, and laundry.

Applications, stating age, nationality, with copies of recent testimonials, to be sent to—

ERNEST S. HEAP, Secretary-Superintendent.

Surrey County Council.

WARREN ROAD HOSPITAL, GUILDFORD.
(General Hospital—450 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ASSISTANT MEDICAL OFFICER (B1). The position will be available for approximately the further duration of the war, and is subject to one month's notice on either side. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Commencing salary according to experience at a point on the grade £350–£25–£450 per annum, plus full residential emoluments.

Applications to the MEDICAL SUPERINTENDENT.

Pontefract General Infirmary and

THE HYDES HOSPITAL. (112 Beds.)

Applications are invited from registered medical practitioners, Male, for the appointment of a HOUSE SURGEON (A), to become vacant immediately, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to—

D. J. RICHARDS, Secretary-Superintendent.

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County Borough of Middlesbrough.
ST. LUKE'S HOSPITAL.

A LOCUM TENENS MEDICAL OFFICER (B1) is required for the above Mental Hospital. Candidates must be duly registered medical practitioners and must not be eligible for service with H.M. Forces. The salary offered is £9 9s. per week, with board and lodging and washing. Preference will be given to those with mental hospital experience.

Applications should be submitted at once, accompanied by three references, to the Medical Superintendent at the above Mental Hospital.

PRESTON KITCHEN, Clerk to the Visiting Committee.
Municipal Buildings, Middlesbrough, 17th August, 1942.

Royal Victoria Infirmary,
NEWCASTLE-UPON-TYNE.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of SURGICAL REGISTRAR (B1) (Open Appointment), now vacant.

Applicants should have held house appointments and preference will be given to candidates holding the Diploma of F.R.C.S. London. Male practitioners now holding A or B2 posts not considered unless rejected by the R.A.M.C. Salary is at the rate of £300 per annum (non-resident).

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent as soon as possible to—

A. W. SANDERSON, House Governor.

Nottingham and Midland Eye Infirmary.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (B1). Applicants should have had some surgical ophthalmic experience. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may apply. Salary according to experience, minimum £200, with full residential emoluments.

Applications, stating age, nationality, qualifications, and experience, with copies of three recent testimonials, immediately to: T. RUSSELL MOORE, Secretary.
The Ropewalk, Nottingham.

Royal Lancaster Infirmary, Lancaster.
(200 Normal Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), to become vacant on 1st September, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months; otherwise it will be renewable. Salary is at the rate of £130 per annum, with full residential emoluments.

Applications, stating age, qualifications, and accompanied by copies of recent testimonials, to—

FRANK A. MILNES, Superintendent-Secretary.

City and County of Newcastle upon TYNE.

SHOTLEY BRIDGE HOSPITAL. (900 Beds.)

Applications are invited from registered medical practitioners (Male) for the appointment of RESIDENT MEDICAL OFFICER (B1). Applicants should have held previous house appointments. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. The appointment is tenable for a period of twelve months, and the salary is at the rate of £450 per annum, together with full residential emoluments.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent immediately to the MEDICAL OFFICER OF HEALTH, Town Hall, Newcastle upon Tyne, 1.

The Children's Hospital, Sheffield
(INC.) (157 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A) vacant 1st October, including practitioners within three months of qualification and liable under the National Service Acts 1939–41, when the appointment will be for a period of six months. Salary is at the rate of £100 per annum with full residential emoluments.

Applications, stating age, nationality, qualifications, and accompanied by copies of three recent testimonials should be sent to the undersigned.

The successful applicant must be a member of a Medical Defence Society.

T. H. G. GARTLAND, Superintendent and Secretary.

Bristol Eye Hospital.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of JUNIOR RESIDENT OPHTHALMIC HOUSE SURGEON (B2). Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply, when appointment is limited to six months. The salary is at the rate of £150 per annum with full residential emoluments.

Applications, stating age, qualifications with dates, nationality and present post, accompanied by three recent testimonials, should be sent as soon as possible to—

D. M. BABER, Secretary and House Governor.

St. Paul's Eye Hospital, Liverpool.

Applications are invited from registered medical practitioners (Male or Female) for the appointment of RESIDENT HOUSE SURGEON (B2), to become vacant on 3rd October, 1942. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply, when appointment is limited to six months; otherwise it will be for six months with possibility of extension. Salary £160 per annum, with board, &c.

Applications, stating age, nationality, qualifications, experience, &c., accompanied by three testimonials, should be sent to the Secretary (GARFIELD WRIGHT).

Kent and Canterbury Hospital,
CANTERBURY. (336 Beds.)

Applications are invited from Male registered practitioners for the appointment of HOUSE PHYSICIAN (A), to become vacant early in September, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary is at the rate of £125 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and accompanied by copies of three recent testimonials, should be sent immediately to: J. F. KENT, Superintendent and Secretary.

Essex County Mental Hospital,
BRENTWOOD, ESSEX.

LOCUM TENENS MEDICAL OFFICER (B1) (Male) (ineligible) required at once for a period of two months. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary £8 8s. per week, and all found.

Apply MEDICAL SUPERINTENDENT.

Rowntree & Co., Ltd., require the
services of a qualified medical practitioner for the position of MEDICAL OFFICER for their factory at York. This vacancy occurs due to the absence of the Medical Officer on military service. Applicants should be over military age or otherwise ineligible for military service. Salary offered not less than £700 per annum. Early application, stating qualifications and experience, should be made to the LABOUR DIRECTOR, The Cocoa Works, York.

Medical Officer required for Mining
Group in West Africa. Knowledge of surgery desirable. Commencing salary £75 per month. Free bungalow, first-class travel.—Apply, Address, No. 912, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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deficient Boy, 18. Only requires supervision and kindness. Live in at modernised farm, Leicestershire. Private furnished accommodation, everything found. Excellent opportunity. State age, experience, and salary required.—Applications in writing to Miss RUSSELL, Eagle House, 110, Jermyn-street, S.W.1.

West-end Practice for disposal outright
or on terms, total purchase price required £500. Client unable to continue practice.—Apply PHILIP CONWAY, THOMAS & Co., Solicitors, 14 Suffolk-street, Pall Mall, S.W.1. Telephone: Whitehall 2601.

For Sale, Medical Practice, Sheffield,
house to rent; Medical Practice, Leeds, house to rent; Partnership share, best suburb, Leeds, excellent house to rent. Practice, good Panel, excellent house to rent, near Rotherham; —NATIONAL MEDICAL AGENCY, 63, Great George-street, Leeds, 1. Grams: Natmedag. Phone: 21207.

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PRACTICES. Incomes ranging from £1,500 to £3,000 per annum. Houses available.

RELIABLE LOCUMS required at twelve guineas per week.—GRIFFITHS' MEDICAL AGENCY, 30, Bridge Street, Newport, Mon.

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Microscope, suitable for pathological
research work, with mechanical stage, triple nosepiece, 1/12th oil immersion, 1/6th and 2/3rd objectives, substage condenser, &c., urgently required. Binocular model preferred.—Please send details to: BOOTS PURE DRUG CO., LTD., Publicity Department, Station-street, Nottingham.

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ILLNESS, ideally situated on the Helford River, receives a limited number of patients for care and active treatment. Special department for Insulin Therapy.—Illustrated brochure from RESIDENT PHYSICIAN, Trenython, Mawnan Smith, Cornwall. Telephone: Mawnan Smith 276.

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